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'Doctors opposition based on ignorance'—Samet

DOCTORS' opposition to computerised medical records systems was based on emotion and ignorance, said BCS president Professor Paul Samet in a letter to the British Medical Journal.

He was commenting on the discussion about computers and confidentiality at the BMA's recent meeting at Cardiff (CW, July 20) at which 16 motions proposing non-co-operation with computers in various ways, were put forward.

Doctors said they were worried that if patients' records were stored on computers, confidentiality would be lost. In particular, the doctors objected to the DHBS's proposed Child Health system (CW, May 4).

According to Samet, doctors did not understand a word about security of records. They should realise there were many other types of sensitive records that needed careful handling, and that solutions to the problem had already been developed.

"The suggestion that handwritten documents stored in an open folder in a filing cabinet are secure is absurd," Samet said. He added that the only security factor they had was the doctors' illegible handwriting. Computers could provide much better security, he pointed out, by providing extra features such as limited access to certain fields of records to certain people who are excluded from seeing other fields.

Efforts to prevent the combination of records from several different sources were hardly valid for medical records. The potential of computers to help anticipate and prevent epidemics, tragedies such as that of Thalidomide, would be lost, he added.

A questionnaire published in the latest issue of the BMA News Review was described by Samet as "daft". It was headed, "BMA News Review is seeking the help of all its readers in gathering evidence to support the growing threat to confidentiality of computers."

It asked such questions as "Should doctors be the persons to safeguard the confidentiality of their patients' records? Are you concerned that, without specific safeguards, computerised records may endanger this confidentiality? In view of the increasing use of computers by Government departments, should the Secretary of State continue to have legal ownership of patients' records?"

Samet commented that the questions told what answers to put. He quoted a headline in the British Medical Journal. "Doctors warn computercrats of ethical dangers". There should be another story, he said, headed "Computercrats warn BMS of medical dangers".

NEWS IN BRIEF

ICL to expand in Europe?

SEEKING to expand and consolidate its position in Europe, particularly the EEC countries, ICL is making a detailed study of the major markets with a view to possible acquisition of or collaboration with European-owned companies.

"There are no deals in progress at the moment," a spokesman told Computer Weekly, "but we are always interested in acquisitions which might further our business, and we want to strengthen our base in Europe."

Banking on 2903s

TWO more banks have ordered ICL 2903s. The New York office of the Banco Totta e Acores of Portugal is to follow the lead of the London office and install a £60,000 2903 when it opens later this year, and the French Credit Industrial et Commercial is to have a 2903 in its London office. It will use an international banking package developed by Arthur Andersen & Co.

B6800 for OUP

THE largest book publisher in the UK outside government, the Oxford University Press, is to acquire a Burroughs B6800 for online working, to replace its ICL 1902T. There will be over 60 terminals in London, Oxford and Glasgow, and the machine will be used for stock and financial control, and also for preparation of the actual text of books.

Paymaster switch

TWO ICL 2900 machines, ordered in 1975 to replace two system 4/50s (CW, October 30, 1975), are now installed at the Paymaster General's Office at Crawley, Sussex.

Ex-IBM man in ITT rejig

IN a reshuffle of executives at ITT Jim Foord (above) has been named director and general manager of the ITT Business Systems Group (UK). He takes over from Dennis Kennedy who has been appointed group director for voice communications with ITT in Brussels. Kennedy was also managing director of ITT Creed at Brighton and that post goes to John Freer, formerly general manager of the company.

Foord, 44, joined IBM in 1960 and later moved to Rolls-Royce, one of the major IBM users in the UK. He then had a spell at Honeywell before joining Potter Data Products as managing director. Before joining ITT as general manager of the Data Systems Division, he was managing director of Adabas Ltd.

Grundy interest in NPL teaching aid

THE electronics and engineering group, Grundy, is producing six prototypes of Muppet, a micro-based system developed at the National Physical Laboratory, Teddington. It is claimed to be the "first hand-held teaching computer."

Grundy, which has a minority interest in Data Recording Instruments, the computer peripheral manufacturers, has also said that it is interested in the commercial production of the device. An interactive system that can be used for such applications as language tutoring, it is one of a number of important developments of the NPL team, headed by Dr Christopher Evans, psychologist and computer scientist. These include the Mickie Hospital patient interviewing system (CW, February 17) and Mavis, the micro-based aid for the severely handicapped (CW, September 15, 1977).

Commenting on the future potential for "personal tutors" like Muppet, Dr Evans said that the next decade could see such demand for them that unit costs could approach £10.

"There is no way the world can afford to give every human being a personal teaching service," he said. "At present, training teachers is expensive and once qualified, they have to time-share their talents among hundreds of students. I believe that in the early 1980s, there will be an immense number of Muppet-like systems in use supporting teachers."

Muppet consists of a pocket-calculator type unit with a one-line alphanumeric display. This has 10 digits and can handle all 26 letters of the alphabet and numerals from 0 to 9. In addition to these there are four extra functions on the keyboard: Space; Go, which acts as a "new line" key; Delete; and hyphen.

Based on an Intel 8085 microprocessor, Muppet now has 256 bytes of RAM and 4K of EPROM; the EPROM being

Muppet . . . claimed to be the first hand-held teaching computer.

divided equally between program and data storage.

Dr Evans, who originated the idea for the teaching computer said; "It took less than a year and under £1,000 to develop Muppet. This shows the tremendous speed at which you can work with this technology."

The NPL team was multidisciplinary, drawing its experience from computers, psychology, and ergonomics. It was this, feels Dr Evans, that enabled them to get around the problems of presenting alphanumeric information on an one-line display and designing a keyboard that is readily usable by anyone.

The keyboard has been arranged so that the vowels fall across the top five keys — a suggestion made by colleagues at Loughborough University, and a design that has brought some encouraging results.

"It appears to be intuitively simple to operate," said Dr Evans. "People can begin typing in responses in seconds."

Basic research into the problems of displaying interactive alphanumeric text on a one or two-line basis was carried out by Brunel University student Hazel Bennett at NPL last year, when a Termiflex hand terminal with a two-line LED display was linked to the lab's Digital Equipment PDP-11 and a simulation program designed.

With just 20 keys and three shifts, operation of the terminal was less than fluid, but it proved that useful information could be provided on a restricted display.

On the prototype model, a French vocabulary program has been loaded on to the EPROMs together with an automatic, albeit limited, English/French dictionary. However, as Chris Gose, the consultant and software designer who built the prototype says, the potential for increasing Muppet's capabilities is enormous.

"There would be no problems in expanding Muppet's size to something like 8K or 10K right away," he said, "and with bubble memory we could extend this still further."

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US bank blacked in PO dispute

THE Post Office Engineering Union's action in support of a 35-hour week has disrupted data communications links with the London office of Continental Illinois, a Chicago-based banking group.

The links connect terminals in the London office to IBM and DEC computers in Chicago via multiplexer and modem equipment in Brussels.

The bank's new offices had only five lines to single telephones. After an initial delay, the private exchange was connected by Post Office management, and the union blacked the firm. A spokesman for the union said that it would stay blacked until the dispute was resolved.

Lord McCarthy has now concluded his series of meetings with the Post Office and the Post Office Engineering Union, and will present his report to Industry Minister Eric Varley at the end of this week.

So far about 150 engineers have been sent home for refusing to install equipment.

Atkinson for DoI

DIRECTOR of the Central Computer Agency, Reay Atkinson, is to be transferred to the Department of Industry in September. He will be replaced at the CCA by Gerald Watson, who at present runs the agency's Policy Planning and Financial Division. Details of Atkinson's new job at the DoI have not yet been released.

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Briefing

Fairchild and GEC join up

A JOINT company to make microelectronic components is to be set up by GEC and Fairchild. This has been agreed in principle and full details are expected to be announced next week.

The new company will have a UK manufacturing base, while product development will be carried out in the US. Fairchild makes a wide range of semiconductor devices, but the new company is likely to concentrate on memories and microprocessors. The main Fairchild devices in the micro market are the 3870 8-bit and the 9440 16-bit units. The latter is still the subject of a lawsuit by Data General (CW, September 15, 1977).

Impact on Europe

THE director general of the Computing Services Association, Alan Benjamin, is to talk to an all-party group of the European Parliament later this year on the needs of the industry and the impact of information technology in general.

Colossus launch

THE new 32-bit mini line due next month from Perkin-Elmer's Interdata division, exclusively revealed in Computer Weekly (May 25), is expected to be built around a 40 Megabyte bus and may have a virtual storage operating system. Code-named Colossus, the new machine will use discs from Perkin-Elmer's Wangco division and displays and printers from the Terminals division.

Research shift

RESEARCH spending by the Department of Industry is shifting slowly from aircraft and space to computer, electronics and engineering, according to the Department's annual R&D Report. Though the largest slice of the £125 million in 1977-78 (£137 million estimated for 1978-79) still goes to space technology, computers and electronics accounted for £8.9 million in 1977-78, and will take £12.4 million next year.

Joint venture?

THE National Physical Laboratory is considering collaboration with Logica, GEC, Ferranti or Plessey for a new version of its pioneering packet-switched network. Full report, page 11.

Wordplex

IN the news synopsis on the front page of Computer Weekly last week, August 3, there was a reference to Wordplex, the word processing equipment manufacturer. We unreservedly withdraw the statement: "The [illegible] Development Corp has come to the rescue of the foundering Wordplex organisation," accept that the statement is entirely without foundation and we apologise to Wordplex. Wordplex and AES are merging in order to expand their operations and an accurate report of the situation was published on [illegible] of the same issue.

IBM groups may oust plug-compatible users

THE London-based bureau, Teamco, could be one of the first users of an IBM plug-compatible CPU in Europe to get the cold shoulder from IBM user groups. Teamco has replaced its IBM 370/155 with an Itel AS/5 and has written to Guide, the group concerned with large users, and the IBM Computer Users Association, asking if it can still be a member of these groups.

UK correspondent of Guide, Barry Aldred, of Southern Gas, told Computer Weekly that membership of Guide would definitely not remain open to users that replace IBM processors with plug-compatible machines. "Allowing users that do not have an IBM processor to stay in Guide would affect our relationship with IBM." However, he added, "We would only allow membership to be retained in special cases such as where a particular user is a positive benefit to Guide."

He said Teamco might qualify as a special case because its parent company in Norway runs an IBM 370/158 and could sponsor its UK subsidiary.

Another Itel user, Unilever Computer Services Ltd, which has three Itel AS/5s, two installed and one coming, told Computer Weekly that it would continue to qualify for Guide because it still had an IBM 360/65 and whether or not it remained in Guide could affect its choice of a replacement.

The IBM Computer Users Association will probably discuss Teamco at its council meeting on September 12. One leading member of the association said that it could be a heated debate because any user of an IBM computer, including bureau customers, is eligible to join the CUA and that to exclude users of IBM compatible kit could be seen as unreasonable.

The position of plug-compatible users in the [illegible] leading European IBM [illegible] Seas, is also uncertain, although its US equivalent, Share, voted last year to exclude non-IBM users and one Amdahl [illegible] understood to have been expelled.

Itel users in the UK, about [illegible] at the moment, are setting up their own user group. This, it is claimed, will be more independent of Itel than Guide and Share are of IBM.

Next president of the BCS

The next president of the British Computer Society is to be Frank Sumner (left) professor of computer science at Manchester University and currently BCS deputy president. This was confirmed at a recent meeting of the Society's council; the deputy president succeeds to the presidency by custom. Julian Bogod of ICL (pictured right) a former treasurer of the Society, was appointed the new deputy president. Both will take office at the annual meeting on October 13, for one year.

EEC initiates software study

By Peter Hewitt

MAJOR studies in the field of software portability, including proposals for a standard European systems implementation language, are to be initiated by the EEC by the end of October. The three studies, for which invitations to tender were issued early in July, also include an examination of the feasibility of a common software interface for minicomputers, and an investigation of the need for new software conversion tools.

The projected European Systems Language, ESL, is intended as a portable tool for implementing software at a level between that of applications programs and the operating system. Specific applications identified by the Commission include the construction of management information systems, database management systems, and information retrieval systems.

The ESL may be an existing language, a development of an existing language, or a new language, according to the tender documents.

Described as preparing ground for future standardisation, the study of the feasibility of a common software interface is targeted at defining a common set of functions for minicomputer operating systems.

By identifying basic common functions, such as scheduling, supervisory, and monitoring functions, as well as higher level functions, such as communications handling, it may be possible to establish a common function set and subsequently a common software interface.

Such a standard interface would be an ideal basis for a standard job control language,

● Turn to page 16

MoD step towards standard

A FURTHER step in the standardisation of real time defence computing is understood to be under consideration by the Ministry of Defence. If implemented, it would require all future applications to use a software system called Mascot, originally developed at the Royal Signals and Radar Establishment.

Until now, contractors have been directed to consider the use of Mascot but have not been

● Turn to page 15

South African police decide on ICL 2900 to administer pass laws

AFTER going out to open tender, the South African police force is reported to have decided to replace its existing ICL computer with a 2900. The new computer is said to be intended for use in part to administer South Africa's pass laws, which regulate the movement and employment of Africans within the Republic. The only ICL computer previously associated with the pass laws is a 1904E, installed in 1968 with the Department of Bantu Administration (CW, September 13, 1973).

All companies active in South Africa apart from IBM are reported to have bid for the contract.

However, earlier this year, the US government imposed restrictions on sales of US computers to the South African defence and police forces (CW, March 16), effectively barring any US manufacturer from completing the order if it had won the contract.

Turn to Page 16

NCR COM expansion with Quantor takeover

ONLY two weeks after the announcement that Agfa-Gevaert was taking over the marketing of Quantor computer output microfilm recorders in Europe from NCR (CW, July 27), NCR has announced that it is acquiring Quantor. NCR in the UK says that if the deal goes through it expects to continue selling Quantor systems in Europe.

NCR and Quantor have reached an agreement in principle under which NCR would acquire Quantor for $7.5 million in cash. The acquisition is subject to approval by the shareholders of Quantor and by the boards of both companies.

Chairman of NCR, William Anderson, said that the takeover would provide the base for expansion by NCR in the micrographics and related fields. Quantor, based at Mountain View, California, turned over $15,524,000 in the first nine months, ended April 30, of its current fiscal year.

A spokesman for Agfa-Gevaert at its Antwerp head office said that he had not been notified by Quantor of any change in the agreement signed between the two companies.

COMPUTER WEEKLY'S INSIDE NEWS

TORY WAY WITH MICROS
If the Tories win the next election the support schemes for micro manufacture with £100 million of investment by the Industry Department, will be maintained. But a very different approach to involvement in industry would be initiated. So says Sir Keith Joseph in an exclusive interview with Martin Banks. Page 5

MANAGEMENT KNOW-HOW
Full membership of the BCS should indicate proven management ability in order to make it an attractive qualification. This is one of the points in a call for a change in the grading structure of the society. Page 3

OPS' CAREER PATHS
The career path for most operators is short and the rungs near the top of the ladder are quickly reached. That's where the frustration can set in; waiting to move into the top positions. Op Spot suggests how realistic career paths could be constructed. Page 8

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COMPUTERVIEW

Professionalism should mean better systems

THE term "professional" covers a spectrum of activities from prostitution to the highest realms of intellectual life. In the computer world, it is a term which has defied meaningful definition yet one which provides a focal point for much discussion.

The latest contribution to trying to come to grips with this jellyfish of an issue is from Roger Griffiths, whose proposal to the BCS professional panel for changing the grading structure is the latest attempt to put practical teeth into theoretical debate (see page 3).

The poles in the debate have always been clearly defined.

On the one hand there is the argument that computer technology is a complex and important science, with an impact on most aspects of personal, social and business life. As such, there is a need for those involved in the development and use of the technology to meet to discuss relevant issues and to provide channels for formulating collective proposals, say on data protection legislation or the latest Fortran standards (see page 4).

In order to define some level of ethical and technical competence to give weight to such collective meetings, it becomes necessary, it is said, to set standards which, for want of a better word, become the definition for the "computer professional," with "professional" in this context aspiring to be a hallmark of technical and intellectual quality, bringing computing into line with other accepted "professions."

The other side of the argument is that thousands already earn their living from computer work although they have, desire and need no further qualifications other than their work experience.

In addition, it is clear that non-computer specialists can develop and use computers more easily than, say, a computer person can pick up the skills of a brain surgeon. There is no need to create standards for computer professionals, the argument goes, because there is no such thing as a computer profession.

Griffiths is nobly trying to bridge the gap by suggesting that there should be BCS grades distinguishing between the technician, who builds systems, and the professional, who has wider responsibility for the development and use of the system.

Yet his case still contains an inner contradiction, best encapsulated by the phrase he uses to help describe a computer "professional" who, he says, "has the responsibility for seeing that it (the system) is completed on time, according to specification and within budget and without waste. In addition he ensures . . . the eventual user will be satisfied with the product . . . ."

If members of the BCS had to satisfy this criterion, based on practical experience, the society would have a very small membership. And if such a criterion were genuinely implemented, the staff shortage in the computer business would be insoluble.

It is right that the BCS, the IDPM and other representative bodies continue to strive for improved standards from their members, particularly where those standards relate to practical as well as theoretical computing. In this light, the Griffiths proposals should be welcomed.

But while the debate over "professionalism" is interesting, it is far more important for these bodies to attack the technical and management issues relating particularly to software developments which have done so much to bring the image of the computer and computer people into disrepute among those users who have suffered from the poor implementations of systems.

In the public's mind, the computer "professional" is closer to that of the overpriced whore than the intellectual giant.

Computastars—the final line-up

THE line-up for the final of the Computastars contest is now complete and an international flavour has been added by two teams from the DP department of SAS, the Scandinavian airline. They are taking part by special invitation and will be flying in for the event, which will be on Saturday, September 30, at the Crystal Palace sports centre.

Over 200 computer people will be taking part in the track and field events and although some may not be of the type seen at the Olympics, they should provide plenty of competition for the finalists and entertainment for the spectators.

The contests and races planned are listed below but it may be necessary to vary the programme on the day. However, all teams taking part will compete in all events. The order of events will not be released until finals day.

MEN: 200 metres, 400 metres hurdles, 800 metres steeplechase, football penalties, football target kicking, Rugby football drop kicks, shot put, discus, javelin, sit-ups, press-ups, dips, frisbee throwing, hop, step and jump, sack race.

WOMEN: 80 metres hurdles, 200 metres, 800 metres steeplechase, netball shooting, hockey ball hitting, long jump, shot put, discus, javelin, sit-ups, step ups, dips, frisbee throwing, football penalties, sack race.

MEN

Group 1: 1 Peterborough Data Processing; 2 Rowntree Mackintosh I; 3 London Borough of Kensington and Chelsea; 4 Clerical Medical and General; 5 MANWEB; 6 Midland Bank London. Group 2: 1 Rank Organisation, Plymouth; 2 Allied Suppliers; 3 Rowntree Mackintosh II; 4 EMI; 5 London Borough of Lambeth; 6 ICL Scientific Languages. Group 3: 1 London Borough of Hounslow; 2 British Steel; 3 UCC; 4 London Transport; 5 Plat Saco Lowe; 6 Department of Employment. Group 4: 1 Gordon and Gotch; 2 Robert Horne; 3 SAD; 4 Midland Bank, Sheffield; 5 Hambros; 6 Wales Gas. Group 5: 1 Midland Bank, Bootle; 2 Commercial Union; 3 Diversey; 4 Rank Organisation Whyteleafe; 5 Scicon; 6 Provident Management Services.

WOMEN

Group 1: 1 Burmah Oil; 2 Woolworth; 3 Commercial Union; 4 Inland Revenue; 5 Provident Management Services; 6 SAS. Group 2: 1 Allied Suppliers; 2 Peterborough Data Processing; 3 Littlewoods; 4 Midland Bank, London; 5 British Industrial Plastics; 6 London Transport I. Group 3: 1 Rank Organisation, Whyteleaf; 2 Foster Wheeler; 3 Midland Bank, Sheffield; 4 Paymaster General; 5 London Transport II; 6 British Relay. Group 4: 1 MANWEB; 2 CASE; 3 Scicon; 4 Rank Xerox; 5 City University; 6 London Borough of Kensington and Chelsea.

Tickets for Crystal Palace can now be booked. They cost 50p for adults and 20p for children under 14. Each ticket ensures a numbered seat under cover in the main stand and provides access to refreshment and bar facilities. Complete the booking form below and send it with a stamped, self-addressed envelope to: Computastars, John Goldsmith (Computer Recruitment) Ltd, 15 Buckingham Palace Road, London, SW1.

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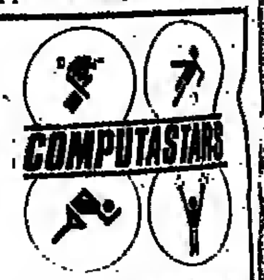

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FOCUS

The do-it-yourself DP manager

ONE of the more predictable events of the year so far has been the attention paid to personal computing. Computer Weekly set the scene in February with MicroSystems 78 seminar and exhibition.

The micro chips have been zapping ever since.

Many DPMs have long believed that computing is a personal affair, with relationships not always harmonious. Being called out at 3am by a troubled operations section often has the DPM wishing the relationship could be more remote.

Although thinking small is not the most noted working mode of the computer installation, most DPMs have in fact been getting it together since the day the equipment was installed. They have long believed that the operations manual should include handy DIY tips, covering such activities as faulty read/write heads, blown fuses, squeaky tape drives and protection switch recovery procedures.

The company managing [illegible] believed that the system is based on DIY principles, especially since the day he was allowed to power-up and press the GO button. The remainder of the organisation follow similar flowpaths. The accountant believes the DPM will be able to do-it-himself in respect of certain highly confidential computer print-outs. End user management suggest that their special amendments should receive the personal attention of DP management — the project being too critical for delegation.

Likewise the personal approach is adopted by computer industry salesmen who, despite all evidence to the contrary, believe that the DPM is sole arbiter of company purchasing decisions. In any case, the DPM is not immune to microcomputing. Over the computing generations, he has been conditioned towards meeting ever-increasing demands with smaller resources.

[illegible] in fact, dawned is confirmed by the rash of interest being expressed by the computer establishment, many of whom seem confused. David Firnberg, director of the National Computing Centre for example, finds it difficult to make any predictions. Apart from such applications as calculators, digital watches and TV games, microcomputing is making inroads into business and industry. These roads, according to the NCC could lead to a dead end for DP management. Future standard office products will incorporate word processing typewriters and intelligent terminals, the purchase prices of which are well within the budget responsibilities of line management.

Meanwhile the Men from the Ministry are getting into the micro act. As often happens with government bodies, their interest could be too late. The time for a Silicon Valley to be created in Godalming or Godstone seems long past.

What should be concerning the DP industry is the setting-up of practical guidelines and standards.

Next month the Institute of Data Processing Mangement, in association with Computer Weekly, is holding a DIY Forum. For all those DPMs thinking of leaving it all behind and setting up a chip shop in Purley, this could well be a not-to-be-missed event.

INTERRUPT

A SMALL British company specialising in the production of one-off printer controllers for esoteric use delivered a printer to a highly confidential place not 1,000 miles north of Geneva. The designer went over to install the machine personally. It did not take long to get it wired in and working, but then a very annoying fault developed.

Apparently at random, in any column, a character would fail to print. The designer changed just about everything in the unit but still the fault persisted. During the night he drew up a huge table of missing characters with column and line numbers but could find no consistent pattern despite fantastic efforts at mathematical analysis.

At 8.30 in the morning the staff of the installation started to arrive just as our unshaven hero was ready to sob into the printer. Trying to hide his face from the bright-eyed international experts he looked down at the unit and at that moment saw it. There was a cigarette burn hole right through the typewriter type ribbon!

Moral: If you find you have missed a very simple fault, write the most complicated possible report on the diagnostic procedure used to find another fault.

[illegible]

French telecoms satellite

FOLLOWING a positive report from the national space centre, the French Minister for Telecommunications, Norbert Segard is expected to decide whether France should put up its own telecoms satellite.

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Ten years ago . . .

COMPUTER WEEKLY AUGUST 8, 1968

THE heart of ICL strategy in the drive for the markets of the 70s was announced as the [illegible] power 1906A . . . ICL's Moscow resident support group of programmers was the first to be set up in the USSR by a Western computer manufacturer . . . After a year of Plan Calcul, France's national computer enterprise, CII, had [illegible] the French market . . . An IDC survey in the UK found Cobol to be the most popular language for third generation machines . . . Plans for a real time airport freight control system at Heathrow were expanded to cover export operations . . . [illegible]

Call for change of grading in the BCS

THE grading of members in the British Computer Society should be completely changed, to give membership more significance and status, according to Roger Griffiths, managing director of Duncan Bransom consultants, who is on both the BCS Council and its Professional Panel.

Full membership, Griffiths says, should be an indication of proven ability to handle managerial responsibility, as in other learned institutions.

This would make BCS membership an attractive qualification for prospective employers to look for, Griffiths asserts, and would encourage more to join the Society.

Griffiths makes these proposals in a paper to be published shortly in the Society's Computer Bulletin.

The BCS Professional Panel is considering the proposals seriously.

Griffiths claims that many in the data processing industry, particularly managers, are not interested in the Society.

He distinguishes between two types of workers. First, there is the "technician", who is concerned only with technical standards of performance, quality, and safety. Then there is the "professional", who has responsibility for seeing that a project is completed on time, according to specification, within budget, and without waste. He also makes sure that the technician's work is satisfactory, that the user is satisfied, and that ethical standards are abided by.

In order to recognise this distinction, Griffiths proposes two grades of membership: Graduate Member, and Member. Graduate Members would be those who had passed exams, while Members would be those who had demonstrated ability to operate effectively in a position of responsibility.

250,000 bits bubble memory from Texas

A BUBBLE memory device with a capacity of more than 250,000 bits will be available in sample quantities from Texas Instruments in the fourth quarter of this year. Called the TIBO 303 the device, costing $500, will offer an average access time of 7.3 milliseconds for the first bit of a 224-bit page of data.

Each bit in a page comes from one of 224 minor loops, each which has 1,137 bubble positions. Bubbles read by being fed simultaneously into an output track from each minor loop and they are also replicated simultaneously. The latter feature reduces the power down cycle time from the 12.8 milliseconds it takes to power down in the existing 96-bit devices from TI that employ serial replication to 12.5 microseconds.

Another notable feature of the TIBO 303 is that each loop consists of a succession of asymmetric *chevron* shaped conductive areas, the bubbles jumping from one to the next as they move around the loop. Existing bubble devices employ successive T and I shaped areas.

For use with the TIBO 303, Texas Instruments will introduce in the second quarter of 1979 a function timing generator, a function driver, a sense amplifier and two drivers for the magnets which create the rotating magnetic fields that move the bubbles. TI will also introduce controllers compatible with its TMS 9900, 9980, 9985 and TMS 8080 microprocessors.

● ISM laser storage, page 5

Euro IFIP for Wembley next year

EUROPE is to have its own IFIP conference and exhibition next year. Euro IFIP 79 is to be held at the Wembley Conference Centre, London, from September 25 to 28. This step has been taken because the last regular triennial IFIP congress in Europe was held in Stockholm in 1974 and it will be at least 1983 before another is likely to be held on this side of the Atlantic. The 1980 congress is scheduled for Tokyo/Melbourne.

A call for papers for the Wembley conference is now available from the BCS at 13 Mansfield Street, London W1M 0BP, tel: 01-637 0471, and the deadline for receipt of notification of intention to submit a paper is September 15.

Gerry Fisher, immediate past president of the BCS, is chairman of the organising committee, and BCS president Paul Samet will be proceedings editor.

Exhibition details can be had from the Business Equipment Trade Association, 109 Kingsway, London WC2B 6PU. Tel 01-405 6233.

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Qube TV records audience response

THE rapid convergence of computer and communications technology, which has already spawned BBC's Ceefax and the Post Office's Prestel services, has led to a significant new development in the US of an experimental interactive TV system.

The cable television service, known as Qube, uses Data General Eclipse minicomputers to record audience response to programmes of commercials and immediately flashes the results back into the viewer's home. It is making quite an impact in Columbus, Ohio, where more than 20,000 subscribers have signed on.

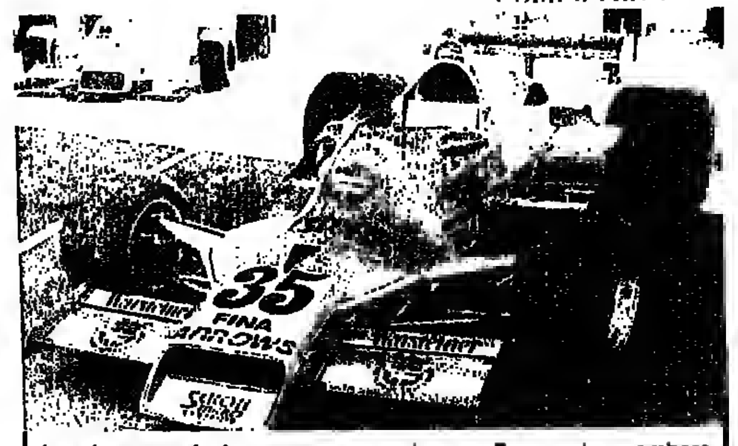
It is operated by Warner Cable Corp, part of Warner Films. The viewer response is made via a 35-key, book-sized terminal installed in the home and linked into Qube through a modem. Thirty of the keys are for channel selection, but the revolutionary feature of the system lies in the remaining five "response" keys.

These are scanned by the computer every six seconds. It records which key is depressed and uses this to compile an instant audience "vote" on any particular topic. This "for" and "against" decision is then immediately displayed on the TV screen of every subscriber taking part in the vote.

Warner Cable says that Qube has been received enthusiastically and that it will shortly be introducing a facility to allow subscribers to raise the alarm on the Qube network, if they have an accident in the home. Basic cost of the system is $10.95 per month.

Varsity chairman

THE new chairman of the Computer Board, which buys computers for the universities and research councils, is to be Professor Robert Churchhouse of University College, Cardiff. He is succeeding Sir Henry Chilver, vice-chancellor of Cranfield Institute of Technology, who retires on December 31.



Less than a month after announcing its collaboration with the Arrows motor racing team (CW, July 13) Scicon Micro Systems is "reviewing the situation" following an injunction granted against the team in the High Court.

The injunction, which concerns the alleged infringement of design copyrights, was granted to Advanced Vehicle Systems, designers of the Shadow DN9 racing car. Two senior members of the Arrows team, Jackie Oliver and designer Tony Southgate, previously worked for the Shadow team.

Scicon had developed a Zilog Z-80 based system that monitored and stored data from several points around the Arrows car, the data subsequently being used to analyse the car's performance.

Premier defends Racal appointment

THE Prime Minister last week denied that there had been any impropriety in the appointment of Admiral of the Fleet Sir Edward Ashmore to a position with Racal (CWI, July 13).

He was replying to Labour MP Frank Allaun who complained about Sir Edward's employment with Racal—a company engaged in military electronics, and with which the Ministry of Defence has contractual relations — within a year of leaving his post at Whitehall.

Mr Allaun claimed that at least two years should elapse before top civil servants and defence chiefs took positions related to their previous posts.

But Mr Callaghan told him in a written reply that Sir Edward had applied under the business appointments rules to take a part-time appointment with Racal. The application had been scrutinised by the Advisory Committee on Business Appointments.

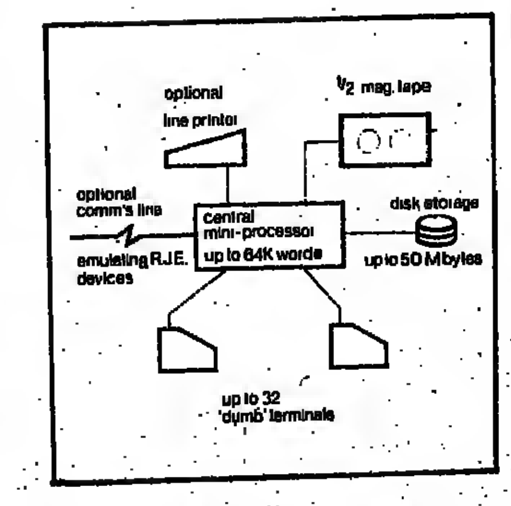
EEC venture capital talks

IN parallel with government-sponsored talks between UK and French peripherals and small systems companies on possible collaboration (CWI, August 3), moves are also afoot to set up a new EEC-wide source of venture capital for technological development.

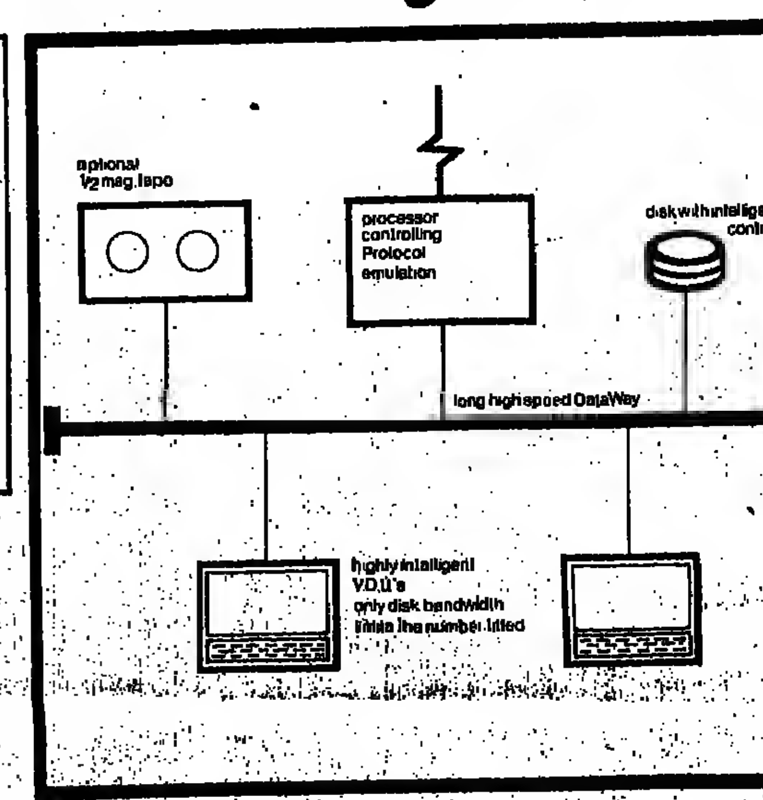
UK, French and West German banks have been discussing the matter, and Technical Development Capital, the high-technology arm of the Industrial and Commercial Finance Corporation, has been involved.

CMC SOVEREIGN

First on the DataWay



A traditional key-to-disk system with every peripheral dependent on one central processor. From 1968-78, though, the most advanced method of bulk data entry.



CMCSOVEREIGN is a data entry system which uses the revolutionary CMC-developed DataWay technique for linking a multiplicity of processors.

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DOWNTIME

by Chad

Plain man's guide

AT LAST I have discovered exactly what all this microelectronics nonsense is about. In a recent article in the Northern Echo, the following paragraphs succinctly set out the facts on both the technology, and the current activities of the National Enterprise Board in this area. The Northern Echo feels it is certain that the NEB will place its new microelectronics facility in its area.

I quote verbatim:

"Computers powered by silicon chips are regarded as the next eras to which technology is taking mankind.

"The North-East plant will produce a computer known as 64 KILOBYT random access memory micro-processor.

"In simple terms, that means the computer, which will be so small that it can be worn on the wrist like a watch, can store and transmit 64,000 separate pieces of information."

So that's what the NEB is up to — IBM beware.

Summer hol

I reached my EOJ
and, trusting my
package
operator,
started my exit routine
to the sun.

Then entered
at Heathrow
a zero-trip loop.

TV sport

As runners clock off
and all the
games people play
are digitised

Only a computer
can place
the source of my unease

I can't put my finger on it.

don

DON'T let on to your doctor that you work in the computer industry. The BMA is showing distinct signs of paranoia about our lovable machines. It is taking a survey of doctors' views on computers and confidentiality, and at the bottom of the questionnaire it says in big letters. "ALL DETAILS WILL BE TREATED IN STRICTEST CONFIDENCE AND WILL NOT BE FED INTO A COMPUTER."

The soft soap hard sell opera

I HEAR Hollywood has acquired some competition from, of all people, Mormons, backed by a computer. Schick Sunn Classics Productions Inc is a film company based in Park City, Utah, many miles from Beverley Hills, specialising in bland, prefabricated, "family entertainment" pictures that, despite being slated by the critics, invariably make money.

Sunn's principal feature is the computarised market research system it uses to plan the films, constructing the story line, choosing the actors, designing the advertising stategy. Traditionally studios have relied on the instincts of executives as to what the public wants to see, but Sunn has teams of researchers who analyse thousands of interviews, prescreenings, and questionnaires from prospective viewers, and the films are constructed according to the results.

Charles Sellier, the studio's president says: "You've got to have a 'consumerable' product. The movie business is no different than marketing soap."

The computer system cost $5 million to develop and it takes $1,250,000 a year to run, but it pays. The films are made on shoestring budgets, with non-union crews and so forth, producing results described by Time magazine as "technically inept", and by Judith Crist of TV Guide as "formularised and thoroughly B-minus". Unfortunately, they make vast sums of money — $28 million gross in the case of "In Search of Noah's Ark".

Many of the films are adventure stories of the Wild West, full of grizzly bears and so forth. Others have been "Beyond and Back", about the experiencee of people who revived after being declared dead, and "The Lincoln Conspiracy", a Watergate-style investigation into Lincoln's assassination. Sunn can predict with considerable accuracy how much money each will make.

Soap, indeed. If Eisenstein were alive today he'd be spinning in his grave.

"Our next film will be The Osmonds Meet the Mummy That Time Forgot . . ."

I've had a complaint about the sexist picture on our front page recently of a girl model greeting her employers' new computer. To make amends, and on the principle that two wrongs make a right, I print another sexist picture, of a Redifon data entry system being delivered to ACT Services, Southampton. The PR female person who had the photo taken describes the removal men as "really dishy," and goes on to say that he looks like John Travolta. Surely he is that beanpole-like figure I see on posters in the Tube? I suspect her glasses need an overhaul.

Home-brewed exit loophole

MY scout in New York has found what could be a loophole in the rules and regulations designed to control the flow of Western high technology to the Eastern bloc. While people in the UK, the US and some European countries can buy personal computers over the counter, these machines cannot easily be exported. The processors for the home-brewed buff are built round Z-80, 8080, and 6800 devices which are often a very advanced design and include components that may not be sent to certain countries under Cocom and other government restrictions.

Nevertheless a steady flow of these machines seeps through the barrier by way of the computer stores. In Manhattan, for instance, there are several computer retailers close to the United Nations headquarters and among their customers are many from the delegations there. Some, hints my scout, could be agents of foreign governments.

They pay cash for the goods, and there is no way of knowing the destination of the machines. Once in the hands of the foreign diplomats — or spies, if you like — the computers can be wrapped in packing that is immune to customs inspection and shipped out.

Perhaps we should now have security clearance to drive a soldering iron?

The revised American National Standard for Fortran, informally known as Fortran 77, was finally approved by ANSI in April this year (CW, May 18). Last week DAVID MUXWORTHY, of the Edinburgh Regional Computing Centre, summarised the main changes in the standard. Here he describes the lines of thought currently being followed by the ANSI Fortran committee, X3J3, in preparing the next standard for the language, due in 1982.

Towards a much better Fortran

IT is arguable that Fortran should not be further developed and that more modern languages should be allowed to replace it. This view has been widely expressed, including within the American Standards Fortran Committee itself. It should not be assumed, by the way, that because the committee is based in the US and deals with a venerable language that its members are unaware of languages like Algol 68, Modula, Pascal and Simula.

However, the committee has over 550 outstanding detailed requests from the public for further additions to Fortran and has taken the pragmatic view that Fortran will continue to play a role in the foreseeable future.

Further development of the standard should have benefits by increasing the power of the language, by minimising differences between implementations and by improving portability and thus indirectly should minimise the costs of programming, or retraining programmers and of acquiring programs.

So far only two decisions have been taken by X3J3 on Fortran 82, so that reference below to particular keywords and syntax is conjectural. One decision is that a metalanguage will not be used to describe Fortran until metalanguages themselves have been standardised. The other is that the Fortran 82 standard will consist of a core language plus independent modules; as a basis for development the core will consist initially of Fortran 77.

This decision is in response to requests to include facilities in Fortran which would be of use to many programmers but which it would be unreasonable to insist appear in all standard conforming systems.

The two immediate examples are database handling and real-time facilities. In both these cases X3J3 is having discussions with other interested bodies, namely the Codasyl Fortran Database Manipulation Language Committee and the International Purdue Workshop Fortran Committee.

Two classes of module have been proposed: one "applications" oriented to cover, for example, database, real time and graphics, and one "features" oriented, to include such things as data structures, control structures and array processing.

The most obvious control structure lacking in Fortran 77 is a looping facility. Instead of going for a simple DO-WHILE, the committee is first specifying a set of requirements for a loop, including the ability to have multiple exits with arbitrary placing, multiple-level exits and unique end of loop processing for each exit. The second is to cope with nested loops and the third could involve an optional CASE sequence at the end of a loop.

Other structures most likely to be included in Fortran 82 are a CASE construct and an internal procedure. The latter at its simplest would be a performable block of statements, which would be apt since the extended range of a DO is not permitted in Fortran 77. However, this is more likely to be extended to be a full internal subroutine or function. The introduction of these facilities would allow computer and assigned GO TOs to be removed from the standard.

There have been arguments in favour of dropping double precision variables and replacing them with the ability to specify the precision, perhaps in decimal digits, of each variable separately. This would have far reaching consequences. It would mean the end of COMMON and EQUIVALENCE for all practical purposes and could affect the separable compilation of subprograms. It is arguable that the resulting language would simply not be Fortran.

Even then the requirements of numerical analysts would not be met and a more likely adoption would be that of a set of environmental inquiry functions from which a program could request details of the host system's arithmetic properties.

This less radical approach would allow for double length complex and double and half length integer variables; packed decimal variables have also been discussed. Other possible types of variable include pointers, labels and bits as well as programmer-defined types. Some of these may be too far advanced when the problems of relating character to numeric storage units have still to be solved in a machine-independent way.

Other things under consideration include extensions to character handling, for example, to allow for null strings, an option to force all variables to be typed explicitly and a statement to allow partitioning of arrays, including dummy argument arrays, into other arrays — a form of synonym facility, eg

```
SUBROUTINE S (A,N)
REAL A(N*N + 2*N + 2)
MAP/A/D (N,N),H(N),S(N),NC,NM
```

This would be of use particularly in writing subroutine libraries but might better be included in a more general form of data structure. More fundamental extensions being debated include dynamic storage of local scalar variables and arrays and recursion.

Array processing was for a time included in the revision of the 1966 standard but was finally voted out. Now it has been raised again and there is some doubt as to whether it should be valid, for example, to consider a row of a two-dimensional array as a single entity when by definition its elements are not contiguous. This could give efficiency problems if the row were passed as an argument to a subprogram. There is also doubt as to whether full matrix arithmetic should be in Fortran 82.

There appears to be little fundamental change so far put forward for input/output. There are proposals to generalise internal and direct-access files and free-format input/output, to consider indexed sequential files, to extend format codes and to address the problems of multifile tapes. It would appear that there is no proposal to adopt NAMELIST, asynchronous I/O or stream access.

For Fortran 77, the view was taken that any relaxation on the rules for the written form of the language should be the function of a preprocessor rather than a Fortran processor. Now it seems possible that a free-form statement will be adopted. So long as labels remain numeric only little change is needed other than to denote comments by other than a letter or digit in column 1 and to devise a continuation convention.

It would appear very unlikely that Fortran would require a semi-colon at the end of each statement but it is not immediately obvious how to make a new format compatible with the old one. Multi-statement lines and comments on the same line as a statement have been requested, as have lower case characters, non-numeric labels and longer names. The problem with the latter two is that they could cause ambiguities in certain statements, eg in

```
DO III = 1,10
```

II could be the label and I the control variable or vice versa. One way round this would be the introduction of the significant blank, almost as radical a departure as the removal of the common block.

Finally completely new areas are open for discussion. These include whether there should be standardised debugging statements and standardised compiler options. Whether or not a field has been mentioned above the whole of Fortran is open for discussion. Comments are welcomed and should be sent to the author.

A MEETING to be held in London at the end of November this year offers the British computing public an unusual opportunity to influence the continuing development of Fortran. A revised American Standard for Fortran, informally known as Fortran 77, was finally approved in April this year and the same document is being voted on for possible adoption as an ISO standard. Since language standards are by default valid only for five years it is already time to be considering what Fortran 82 should contain. The London meeting will be held under the auspices of ISO and will discuss Fortran 82.

Since, in effect, ANSI produces the Fortran standard on behalf of ISO, the object of the meeting will be to allow other countries to advise ANSI of their needs at an early stage of the development. The BSI Programming Languages Committee has set up a working group whose function is to collate British opinion as input to the meeting; comments should be sent to D. T. Muxworthy, Edinburgh Regional Computer Centre, Mayfield Road, Edinburgh EH9 3JZ.

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IBM and Xerox settle patents suits out of court

A SETTLEMENT out of court has been reached between IBM and Xerox in the patents suits they have been fighting against each other. The two companies have agreed to drop all litigation and grant licences to each other for all their patents. In addition, IBM will pay Xerox $25 million.

Xerox first sued IBM for infringing patents in 1970 when IBM brought out a plain-paper copier in an attack on a market hitherto dominated by Xerox. IBM retaliated earlier this year by suing Xerox for infringing its word processor patents with the Xerox 800 series Electronic Typing System (CW, March 9). Over the intervening years Xerox brought several more suits against IBM, both in the US and Canada, and only one was concluded — a Canadian suit which Xerox won.

The chairmen of the two companies, Frank Cary (IBM) and Peter McColough (Xerox) issued a joint statement in which they said that the patent disputes had "resulted in significant cost and a substantial drain on management time, product development and legal resources of both companies. Putting these issues behind us will enable each company to concentrate on the basic business of dealing with the opportunities of the marketplace."

Under the new arrangement, the sharing of patents will cover all of both companies' products, and will apply to all patents existing now or applied for over the next five years. There will be no charge for the use of any of the patents, apart from the lump sum of $25 million IBM is paying now.

The agreement covers computer patents as well as those of copiers and word processors, but as Xerox is no longer in the mainframe business this is unlikely to be of significance.

Although they are no longer suing each other, neither company is out of the litigation woods yet. Both are being sued for monopolising their markets, IBM by the US government, and Xerox by two other copier makers, SCM Corporation and Van Dyk Research Company. A jury in Connecticut last month found in favour of SCM, but has yet to assess the damages to be paid.

Tories to let DoI micro policies run course

A FUTURE Conservative government would allow the current Department of Industry schemes to invest around £100 million in microelectronic manufacturing and use (CW, August 3) to run their three to five year course. But there would still be a radically different approach to government involvement in the industry, according to Sir Keith Joseph, the Conservative Party Industry spokesman (writes Martin Banks).

"The role of government as customer will be a key element in the Conservative party's relations with industry if it is returned to power," said Sir Keith in an exclusive Computer Weekly interview.

Such clientship, he said, should be concerned with pushing the "state of the art" in design philosophies and concepts, but should not be concerned with defining particular designs. "The government's role should be in laying down specifications against which industry can design products that have the widest, preferably world, market," he said.

This method of supporting and promoting industry has been standard practice in the Ministry of Defence for a long time, he said, but many other government departments with similar purchasing power could do the same.

Following his recent criticism of the Post Office in this respect, he added that he felt it was not showing signs of improving its clientship with suppliers.

The Department of Industry schemes, he said, were time limited, and were due to run out "within three to five years." They would be allowed to run their natural course, and would not be dismantled, he said, but the DoI would not be encouraged to "sell" the schemes to industry on a continuing basis.

Sir Keith said "I am not enamoured of the proliferation of subsidies to industry, they do more harm than good. There may be a special reason to justify it, but that cannot be assessed from opposition."

While not approving of the method of support for the microelectronics industry, Sir Keith has already said that the Conservatives would honour existing commitments made to industry, if they won the election (CW, August 3).

New computer storage method based on lasers

Storage arrays with a density of 100,000,000 bits per square centimetre could be commercially available in the not too distant future if the work being carried out by these scientists at IBM's research laboratory at San Jose, California, comes to fruition.

The storage technique the scientists are working on is called photochemical hole-burning. A laser beam is concentrated on a sample of photoreactive material and the frequency of the beam is set at a number of precise levels in order to change the chemical nature of the molecules that are receptive to those specific frequencies. This means that the material can no longer absorb light at those frequencies and the "holes" created can be used to represent binary ones while the absence of a "hole" can indicate binary zero.

According to IBM, the frequency absorption peak of the material is wide enough compared with the laser frequency to allow 1,000 "holes" to be burned. They can then be read by reducing the power of the laser and varying its frequency over the same range as that used for writing.

This frequency addressing method could enable 1,000 bits to be stored in an element of photoreactive material one micrometre in diameter, so that 100,000,000 elements could store 100,000,000,000 bits in an area of one square centimetre.

A US patent entitled "Frequency Selective Optical Data Storage System" has just been awarded to four IBM scientists working on the project. The three in our picture [from left], Dietrich Haarer, George Castro and Roger MacFarlane, are shown adjusting an apparatus that projects light from a laser on to a sample of photoreactive storage material.

George Castro, who is manager of the physical science department at the San Jose lab, says, "We have a long way to go before this can be made into a technology. So far we are investigating a variety of potential storage materials and are trying to understand the temperature limitations of the phenomena." The technique works only when the photoreactive material is cooled to nearly absolute zero, the temperature at which thermal motion ceases.

ITT into word-process Orbit

WORD processing products, a group of remote batch terminals and an alternative to IBM's projected local processor codenamed Orbit are all planned by ITT, according to Jim Foord, the *newly-appointed* director and general manager of ITT Business Systems Group (UK). Orbit is expected to be a 32-bit minicomputer for use in distributed processing applications as a replacement for the IBM 3790 system and is likely to be announced by the end of the year (CW, June 8).

Foord said that ITT was waiting for IBM to introduce Orbit before making a move. There was no intention of introducing a direct alternative to the IBM 3790 remote communications system before then because Orbit was likely to supersede the 3790.

Foord told Computer Weekly that ITT would be "mad" to stay out of the word processing market and was definitely making moves in that direction.

He said ITT's policy was to concentrate on the electronic office and data communications markets, in the latter area with its IBM compatible products, but it had no intention of challenging IBM with plug compatible disc or tape drives.

One area to which ITT was "totally committed," according to Foord, was the remote batch terminal business, and ITT would be launching a group of RBT systems later this year, weighing in against existing suppliers like Data 100, Harris Systems and Four Phase, as well as against IBM itself.

The new products would be new versions of the 3830 RBT introduced by ITT last year (CW, September 22, 1977). Foord said the 3630 had not proved satisfactory for the market and was no longer being sold.

PO £24m order

TO upgrade the UK telex network the Post Office has ordered 12,000 ITT Creed 2300 teleprinters worth a total of £24 million. Delivery is due to be completed by the end of 1979.

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Weinstock's view of the computer industry

TAKING issue with a statement in last week's Computer Weekly that he was "lukewarm towards the computer industry," GEC managing director Sir Arnold Weinstock told Computer Weekly that he views the computer industry as very important to GEC.

Underlining the commitment being made by the company to the GEC Computers subsidiary, a spokesman pointed out that turnover doubled in the year to March 1978, and will double again this year. He also noted that a new plant has been acquired (CW, July 27).

"We have taken a lease on a new factory at Dunstable and have plans to acquire more space there, and the first computer will come out of the new plant in October," he said.

Royal medal for Prof Kilburn

COMPUTER pioneer Professor Tom Kilburn has received one of this year's three Royal Medals, presented by the Queen on the recommendation of the Royal Society.

Professor Kilburn, who is pro vice-chancellor of Manchester University, is already an FRS and a Distinguished Fellow of the BCS. He receives the Royal Medal "for his striking innovations in computer hardware over 30 years." With the late Professor Fred Williams, Professor Kilburn built the world's first stored-program computer, the Mark I at Manchester.

Basic Timesharing seeks systems builders

SYSTEMS builders are being sought by Basic Timesharing to write application software and sell the BTI 4000 business timesharing computer system to specific market sectors.

The BTI 4000 is built around Hewlett-Packard 21MX mother boards by Basic Timesharing in California, and runs a proprietary BTI operating system, key features of which are security from disclosure of customer information and the ability to support a large number of terminals, up to 32, depending on the applications being run (Software File, June 29).

Three distributors have so far been appointed: Kalamazoo, which offers the system to the motor trade for processing of spare parts; Wordwright, which has developed word processing software alongside the general accounting packages; and Cara, which runs a bureau on one BTI 4000, uses another for program development, and sells the system to its customers in Ireland.

Basic Timesharing would like a dozen UK distributors, each operating in a specialised market area which does not conflict with any of the other distributors.

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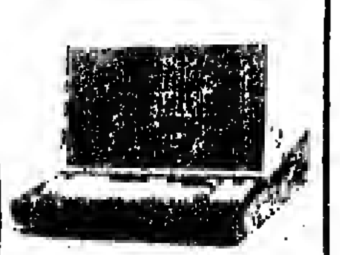

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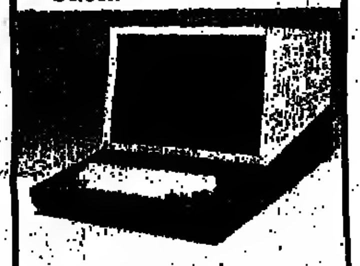

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GILB'S MYTHODOLOGY

Professional challenge of 'good' programmer

TRADITION dictates that a good programmer is capable of producing error-free programs, in a short calendar time, which run very quickly in operation and which take little primary memory space during execution.

Unfortunately tradition is rarely a useful guide when applied to a rapidly changing set of human and machine economics.

Let me give my particular definition of "programmer" for the purposes of this discussion without pretending that it is the "right" definition for the whole world.

A programmer writes source code for machine interpretation, and carries out a varied set of associated tasks in order to arrive at the source code and to verify reasonable correctness and future usefulness of the programs.

The programmer is not primarily a designer of the system, but is primarily the function that translates a reasonably detailed design into a practical working program and associated test data, documentation and control statements.

This above definition does not preclude the programmer from performing application analysis, system design or project management — but these are other roles, which I am excluding from this discussion.

Now, what is a "good" programmer? My general answer is one who can translate the system specification into a working program and meet any feasible specified set of goals and constraints.

Notice that I did not say anything about getting the job done quickly, or writing elegant structured logic. The list of potential programming goals and constraints may be long and varied from time to time. The goals and constraints can vary in degree and in the way in which they are specified or set.

The goal/constraint list might include such varied factors as ease of expansion of logic in the future; maintenance ease; portability; failure reliability; automatic recoverability from error situations; and degree of automatic testability.

This list is in no way intended to be complete, but only to stimulate us to remember some of the attributes which a programmer might be expected to produce.

Notice that I have not included space or speed requirements, partially because they are obvious, and partially to dramatise the point that they may not be critical to a given application.

The better a programmer is, the better he or she can respond to any set of requirements for program quality, and to any set of levels or degrees of those qualities.

The varied requirements have a staggering number of permutations. The professional programmer must be prepared to learn a very large number of technological approaches for constructing programs to meet these requirements.

The programmer must be prepared to update this knowledge as new methods and techniques develop, and this is a staggering task which even at present requires the use of a handbook of current practice and products, rather than any attempt to learn it all by heart.

I realise that many programmers' real world is limited to getting the functional applications requirements apparently working in a minimum of time, that they are too rarely required to do more initially, and that there is very little reward in most environments for initiating quality improvements which the managers, users and designer/analysts should have specified, but failed to do so.

But we are maturing as a profession; an increasing number of working environments will be looking for and rewarding the highly professional programmer. One who is not caught up in the outmoded and inflexible dogmas of structure or testing or documentation or language, but who is prepared to make the fullest possible use of the known programming technology in order to meet the quality requirements of the users — however unusual these may be compared to the run-of-the-mill program.

The "good" programmer is fully aware of the tools of the trade, and their limitations. He or she is able to "know what they do not know" and admit it to others — and then to enhance their knowledge by looking for answers. Becoming a "good" programmer is a continuous professional challenge.

Old methods never die....

RONALD WARMINGTON'S remarks (CW, July 13) on my "Verification is dead — almost" column (CW, June 15) are most welcome. I cannot disagree with the points he makes and find his examples of the limited survival of verification most useful.

I would particularly like to thank him for bringing up the aspect of fraud prevention. I must admit that I was not conscious of this aspect of verification. I was engrossed in the cost/affectiveness aspects.

It would be most interesting if Mr Warmington or other readers would care to comment on their experiences with multiple person data entry verification techniques as a fraud prevention and detection device. In particular, I should like to see this compared with the option of using automatic checks on a single human data entry operator.

Certainly my hypothesis was rather strongly worded in an attempt to provoke revaluation if we are using it extensively. I don't think it will ever totally be obsolete, since it probably has a set of properties needed by special applications, which is a better [illegible] technique for that application. Old techniques, like Old Soldiers, never die, they just fade away.

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GIM offers 32K ROMs

TWO versions of a 32K bit ROM, offering 450 and 3500 nanosecond access time respectively, have been added to its range of memory products by General Instrument Microelectronics.

Known as the RO-3-9332, the ROM is a fully static device that can be used to replace directly two 16K parts without recourse to redesigning. According to the company, four other 32K ROMs available are "edge triggered" dynamic

Buffer to eliminate printing bottlenecks with teleprocessing

WITH the addition of remote printer buffering to its IBM replacement TP monitor Thirst, Brown's Operating System Services aims to eliminate a major bottleneck associated with remote printing to IBM 3270 or equivalent printers.

With most TP monitors, remote printing is slowed down considerably by the inability of the printer to buffer transmitted data while it is printing. The printer, able to perform only one job at a time, has to wait to receive a complete block before it is able to print and therefore never reaches maximum printing speed.

With the new Thirst feature, a user can designate as a buffer any device which is attached to the same control unit as the printer. The designated device, for example a display, takes over the job of receiving the transmitted data.

Developed in the UK and available in the UK and Europe for the last seven years, Thirst has been notably successful in achieving fast response times in DOS and DOS/VS sites supporting large numbers of terminals.

Brown's Operating System Services also markets an on-line program development system called Shaft. Including a source library update facility, the software enables programmers to amend and flat a program, submit it for a run, and examine the results all while sitting at a terminal.

A stand-alone package, Shaft can be run on DOS/VS systems either with or without a TP monitor. It uses a 64K virtual partition, 16K of which is fixed, and rents for £1,200 per annum for a three terminal system, with a further £400 per year is payable for each additional terminal.

Latest to install the software was Unichem Ltd, a pharmaceutical wholesaler, which operates a 370/148 supporting a network of over 200 terminals. Unichem chose the product because it "outperformed all the others", according to its DP manager, who added: "We have achieved some spectacular productivity improvements."

Shrinking data storage for IBM OS users

A SOFTWARE product introduced to Europe and the UK by Informatics SA offers IBM OS users substantial data storage and transmission economies as well as an unusual approach to file security.

The system, Shrink, provides generalised routines for data compression and encryption. It works by analysing each file to identify the most frequently used byte combinations, which are then coded as bit patterns.

The recording is said to be able to achieve major savings in storage requirements, typically reducing a commercial application file to between 20% and 40% of its original size.

As well as reducing online storage needs, the compression of data can also reduce line and modem requirements and costs in computer-to-computer communications and data transmission. Similar savings are possible in channel utilisation, reducing turnround time on I/O bound jobs and improving throughput.

Security benefits arise from the fact that Shrink encodes each file uniquely. Thus even if data is stolen, it becomes meaningless without the system's decryption keys.

Shrink is accessed by Call commands incorporated into application programs after standard read/write statements. Said to have low memory and execution overheads, the system can be specifically instructed to leave record key areas untouched.

Real time disc subsystem

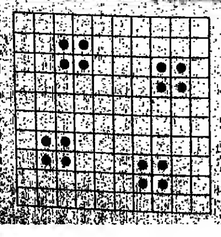
A DISC subsystem for use in real time applications based on the PDP-11 is being implemented by Gemini Industrial Systems for ICL. It is designed for systems in which limited core store is available for sequencing programs. The disc subsystem stores programs a priority according to their rote of use and stores them on disc. Those with high priority are permenently loaded into memory, while those with lower priority are overlaid into memory as required.

The system is for use with a process control package written by ICI in RTL/2 for batch-oriented chemical plants. Gemini UK has been closely involved in the development of the package, which uses ICI's multi-tasking operating system, MTS/3.

Mid-Cheshire firm

CLAIMING to be the first software house in mid-Cheshire, Pentagon Computer Services Formed in June. It said that it has "considerable experience of IBM, ICL, and Burroughs systems but plans to concentrate on specific mini and micro market sectors. Its offices are at 390 High Street, Winsford, Cheshire. Tel: 06065 54050.

Puzzler



THIS diagram shows the only way (not counting rotations and reflections) to place 16 chess Knights on a 10 x 10 board so that all unoccupied squares are under attack by at least one Knight. There is no way to do the job with fewer than 16 pieces.

This week's problem is to carry out the same task on a 9 x 9 board, using the minimum number for that area, which is 10 Knights. See page 37 for the only possible configuration.

BCS Codasyl debate

A conference on Codasyl database developments is to be held by the British Computer Society at the South Bank Polytechnic in London on September 4. The speakers, members of the BCS Codasyl DBAWG and DDLC, will include Ed Tozer of Arthur Andersen and Roger Tagg of Scicon.

The registration fee is £20 for BCS members (£10 for students members) and £25 for non-members. All delegates will receive a copy of the 1978 Codasyl Data Definition Language Journal of Development.

Pentagon funds SIL based on Pascal

THE US Department of Defence is funding the development of the first compiler for a new systems implementation language based on Pascal. Called Euclid, the language is specifically designed for writing systems software that must be verified.

A major objective of the research is to improve the reliability and security of system level software, by facilitating the production of code that is certifiably correct. The compiler is being written as a joint venture by the Toronto University and the timesharing company I. P. Sharp, best known for its expertise in APL. The work is being funded by the Advanced Research Projects Agency of the Dod (ARPA), which also set up the project to design the language. Although the software will be the property of the DoD, it is intended that the work will subsequently be widely publicised. It is possible, therefore, that the compiler will eventually enter the public domain, as is the plan for the Ironman real time language, also an ARPA project.

According to an I. P. Sharp spokesman, the first implementation will be for Digital Equipment's PDP-11 range, models 34 and above. It will run under the UNIX operating system developed by Bell Laboratories.

The language will be suitable for constructing complete operating systems, it is understood, as well as for writing "unbreakable" security modules or kernels to prevent unauthorised access to data.

An interesting aspect of the project is that many of the requirements established for Euclid also form part of the Ironman requirements.

Experience gained in the implementation of Euclid, which has already been under way for about a year, could therefore contain important lessons for the two remaining Ironman contractors.

One significant area is that of aliasing, which both languages are anxious to prohibit. According to Dr Brian Wichman, of the UK National Physical Labratory, the Euclid team has already shown in some major cases that aliasing can indeed be trapped.

● Euclid should not be confused with two existing graphics software packages, which already share the name. These are the system developed by Davy Computing, of Sheffield, and a Franch-developed package offered in the UK by SEL (CW, November 17, 1977).

Generating N/C tapes from desk-top machines

A COMPANY which specialises in engineering application software for Hewlett-Packard systems has produced two packages for desk-top computers which generate tapes for numerically controlled machine tools.

The packages, which are available from Engineering Computer Services Ltd, run on HP-9825 systems and implement the AP 100 system for machining centres and the AP 200 system for turning centres. The software includes post-processors which convert the basic geometry into machining instructions for specific machine tools.

Said to include tape preparation and verification facilities sufficient for about 90% of all NC work, the systems are targeted at two main categories of user: first time users currently preparing tapes manually or using a bureau; and those wishing to extend existing in-house capabilities.

The programs, which use question and answer techniques and are written in an APT-type language, cost £2,750 each, and the post-processors between £400 and £700. The company will also supply completa syatems including hardware from around £15,000.

● Engineering Computer Services is at Piccadilly, Tamworth, Staffs. Tel: Tamworth 872084.

Using Telex terminals as a link to a network

THE widespread availability of Telex terminals must have prompted many to consider their use as a link to a computer network, particularly where a company is reluctant to hire or buy a terminal solely for DP activity.

In addition to being commonly in use already by many multi-centre offices, Telex facilities have the further advantage that Telex lines to Europe and elsewhere are in general more reliable than telephone lines for data transmission.

The relatively slow speed of the Telex system, viz 15 cps, limits its use in receiving and printing lengthy outputs. However, the system can be adapted fairly easily for submitting regular input data to an application system and receiving short reports.

In the input role, the best tactic is to prepare paper tape input offline and feed it through the reader once the terminal has been connected to its destination. With a machine such as the Teleprinter 15 Auto, this method is cost-effective and also helps to minimise the error rate.

However there are snags. One problem is that the input is not under the control of the receiving computer — the Telex terminal acts rather like an operator who never stops typing. Also buffer sizes are small so that data can be lost if much processing is performed on each input record.

In addition, end-of-record can be a problem as it is indicated by a pair of characters — carriage return and line feed — rather than by a single code.

Many common Edit Build file type commands will accept either characters as a record terminator, but having taken carriage return as end-of-record, line feed will be interpreted as a null record and, therefore, end-of-file.

So the input program itself must handle null records, which is virtually impossible with a Build-type command system. A special terminator is also required for end-of-file.

After end-of-file, it is normal to allow a few inches of blank tape to feed through. However, the Telex character set does not include a null character — corresponding to no holes punched — so a wait command should be included, say for five seconds, to allow the tape to end.

This is because, until the tape has ended, it is not possible to return a message reporting that the data has been accepted, or to return an exception report.

Atkins On-Line, at Epsom, has been using Telex in this role for many years and has found APL an ideal language for writing a Telex input program, including routines to translate the Telex character set.

Cross refs in preprocessor for DEC Coral

A PREPROCESSOR for Coral and a file handling system, currently written in DEC Coral for the PDP-11, are the latest packages to be announced by consultants Brampton and Brampton, previously based in Lewes, Sussex.

The Coral preprocessor, itself written in DEC Coral, offers three main facilities: source code reformatting; the generation of cross reference listings; and the ability to code Coral reserved words in shorthand form.

Source code formatting, which is thought by some to be a function better left to the computer than to the programmer, is designed to show clearly the block structure of the program by the use of systematic indentation.

Statements at the same logical level all begin in the same column and labels are left-justified to the edge of the listing.

Similar processors have been developed in the past by the Royal Signals and Radar Establishment, Malvern, and by Stephen Howe (Consultants) Ltd.

The new package is notable for providing in addition a cross reference listing. This summary, output as a comment after the FINISH statement, lists all identifiers and labels in alphabetical order with each occurence documented by line number. The software is sold by Brampton for £500.

The other new package, Varifile, provides RSX-11 and IAS users with a flexible filing system said to be particularly suitable for online and data base applications. It can be accessed by any language running on the PDP-11.

Particular features include support for variable length records and variable length keys within one file; a facility for generic operations, using partial keys; and the dynamic mapping of user files onto logical units.

Benefits claimed for the system include fast operation, efficient use of disc space, and easy file handling. The package, which is also being implemented in PL/1 for IBM 370 systems, is available for £4,000 and can also be rented.

● Brampton and Brampton, which also markets aids called Cosh and Coln for Coral string handling and interactive testing respectively, has moved this year to: The Old Thatch, Cardinals Green, Horseheath, Cambridge. Tel: 0223 891725.

Online maintenance of Fleet program library

AN online version of the Fleet program library maintenance system has been announced by SDI for IBM DOS and DOS/VS users.

Fleet Online allows programmers to update source programs interactively and examine the output from compilations and test runs on a video terminal before routing output to the line printer.

Users of SDI's Grasp may in addition use the system to submit jobs to the batch input queues.

The software runs in a 64K batch partition and is thus not dependent on a TP monitor. Up to seven display screens can be handled simultaneously, which may either use individual libraries or share program libraries.

Aussie DBMS for NCR machine is launched

A DATABASE management system that runs on a range of NCR machines has been developed by Stanwright Consulting Services, an Australian software house based in Melbourne, according to published raports. The system, Access, is said to be available for supported on NCR hardwars, the other being Cincom's Total.

The provision of aids for converting from Total suggests that at least part of the market anticipated is formed of existing Total users. In addition to being logically compatible at file level, the system offers a bridging facility such that Total application programs do not have to be recompiled on changing to Access.

Said to offer features including easy-to-use data definition and data manipulation languages, extensive run-time diagnostics, and dynamic buffer allocation, the system also provides utilities for database back-up and restore and database recovery.

● The news follows reports that both Cincom and Honaywell have shown interest in Pobol, an end-user oriented language also developed in Melbourne, Australia (Software File, May 25).

Interactive Cobol

AN INTERACTIVE version of Cobol has been announced by Ventak for use on its Datapoint computer systems. Compilable on any system with at least 48K bytes of memory, the language includes features for screen formatting and operator prompting, as well as facilities to accept, reformat, edit, and process online data input.

Details of Univac production control pack

WITH the formal launch of the package in the UK, more information has become available on the manufacturing control system developed by Univac for the BC/7 small business computer (CW, April 6).

Designed for small and medium sized manufacturing businesses with turnovers between £500,000 and £7 million, the production management package is intended to be set up and run by production management staff themselves.

The system, designed for predominantly batch-orientated manufacturers, consists of three main modules: bill of materials and inventory control; scheduled receipts; and materials requirement planning.

The Bomp sub-system, based on a parts master file and product structure file, provides a range of explosion facilities, yielding such information as component use quantities either directly or as an input to other modules, for example requirements planning.

The latter function handles a time-phased production plan of end-products, over up to sixty forward periods. By comparing predicted component requirements with stock on order information, net requirements can be identified, offset by supplier and manufacturing lead times.

A complete hardware/software system, requiring no specialist or computer staff to operate it, can be rented from about £600 per month, notes the company.

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OP SPOT

By Bernard Allen

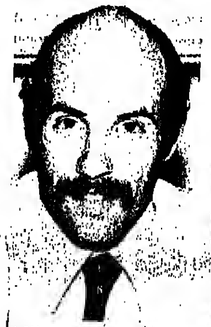
Realistic career paths for operations staff

FOR the typical operations person, the trip up the promotional ladder is swift but soon ended: he climbs quickly to the level of senior operator but finds further progress very hard going.

This is a sad and wasteful state of affairs. It is frustrating for the staff and detrimental to both the companies concerned and the computing industry as a whole.

To rectify the situation, and so make use of the vast wealth of ability and experience that exists within operations, we need a change in the attitude of companies, a greater awareness from operations managers, and a broader definition of the term "operations." In a nutshell, we must have realistic career paths for operations staff.

The first step is conceptual in nature. The computer industry



Robbins . . . "We view operations as a starting point."

must realise that operations encompasses much more than operating the system, and that the operators themselves are much more than button-pushers.

DP management must accept the fact that operators, during the normal course of their work, become involved in technical matters which relate both to the systems hardware and to its software.

This point was raised by George Stevenson, a contract operator, when speaking at a meeting of the Central London Branch of the Data Processing Menegement Association (Op Spot, May 25).

He said that DP management must realise what operations is all about and encourage operators and programmers to work together for their mutual benefit.

Fully endorsing Stevenson's views, I would add that management must also be aware of the management potential of operations staff. Remember that on the evening and night shifts, the role of the person in charge is primarily that of decision-maker, often under pressure.

Taking these factors into account, a realistic career path would lead either into technical support roles, including trouble-shooting, or positions which call mainly for supervisory ability. In the latter case the progression might well mean moving out of the computing department.

Add to all this the fact that more and more sites are implementing TP networks of one sort or another, and we have another direction in which operations staff may progress. In fact a move into TP would prove to be very interesting. It calls for a thorough understanding of the workings of the system, and provides the opportunity to visit the sites of the users.

If operations staff wish to move into programming or systems analysis they should be given the opportunity to do so. A good method is to move the operator to the department concerned for a trial period of a month or two. If he is happy there, and the department is satisfied he has the ability for the work, the transfer should be made permanent.

Of course, the part played by the operations manager is of great significance. He must take an interest in his staff, and take the trouble to find out what their abilities are and where their interests lie.

He must carry out staff appraisals every three months or so.

Taking the operator's abilities and interests into account, the computing courses he will be sent on should be worked out. It is important for him to attend the courses at the right time if they are to be instrumental in shaping his career.

Fortunately, some companies are aware of the importance of the talent that exists within their operations team. At BOC Datasolve, for instance, the progress of staff is monitored closely with a view to placing staff in positions for which they are suitable.

John Robbins, who is Datacentre manager at Data-

Operators often complain that nobody listens to their point of view. Well, Op Spot is listening and Bernard Allen would like to hear your opinions and ideas on all matters relating to computer operations.

Your letters should be sent to Op Spot, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU. Telephone calls are equally welcome and Bernard can be contacted

solve's site in Oxford Circus, told me: "We view operations as a sort of starting point. We keep an eye on the staff to see what attributes they have."

But operations staff must take the initiative themselves. Speaking at the aforementioned DPMA meeting, Jack French, operations manager at the Bishopsgate site of the Bank of Belgium, said:

"Many operators are not sufficiently interested to become involved in technical matters. Too many are just interested in getting home early."

Before French's staff set about lynching him, I must point out that he went on to say that those with the right attitude and motivation should be encouraged and helped to move into technical roles.

The point about attitude is of great significance. Let's be clear about what I consider to be the "right attitude" from operations staff. It is all about investigating technical matters at a level slightly deeper than is considered the norm. It also concerns taking the trouble to ask questions and reading technical manuals which are often quite difficult to understand.

I emphasise this point because it is the one which some operations managers and the majority of DP managers always seem to miss. To them the "right attitude" means scurrying about the computer room and looking busy. To please them, there is no need for technical expertise or appreciation of the system. Just look busy and they will rate you as a good operator.

Finally, let's consider career progression in relation to shift allowance.

Now for a person to come off shift work he must be willing to forfeit his allowance and, if he has been with the company concerned for a considerable time, that might be a reasonable, if not princely, sum.

Some argue that to overcome this problem, operations staff should be encouraged to live off their basic wage and save the allowance. They say that this will prepare the operators for the time when they have to sacrifice the extra money in order to further their careers.

I believe we need a complete rethink about the shift allowance, because at the moment too many companies and staff associations seem to think of it as a perk for operations staff. The role played by operations staff should be reflected in their basic wage.

HINT OF THE WEEK

Successful jobs should be displayed, too

THIS week's hint relates to George 2 macro messages, and is from Ron Linton, who is computer operations controller at Manchester Polytechnic and a regular contributor to Op Spot.

According to Linton, in the event of a production job failing, the operator will have to contact someone in the programming department. He calls for standards to make the operator's life that bit easier.

"To make the failures obvious, it is worthwhile setting as a standard that every job, upon completion, should display to the operators a message of the form 'RUN-OK or 'RUN FAILED'."

Ron says that these messages should be written into each job description or macro, and explains why it is necessary to notify the operator of the successful job as well as the failures.

He says, "It is not sufficient to assume if there is no failure message that the job is OK, because it is possible for a faulty job description to simply 'drop off the end' and bypass a failure message.

"I have known the latter to happen, with the result that a failed job was assumed to be correct, and a subsequent job run tried to utilise the results of the first."

● I'm keen to hear your technical and non-technical hints, and offer £8 for each one that is published in Op Spot. Please state clearly your name and that of your company, giving a telephone number on which you may be contacted during the daytime.

Union calls for VDU health hazard research

CONCERNED for the health of its members, the National Union of Bank Employees has requested that Lloyds Bank carries out some research into the health hazards of operating VDUs and microfiche readers.

Areas defined by the union are the danger of radiation and the long-term effects on the operators' eyesight. The union has also asked the bank to arrange regular eyesight check-ups for the operators of the units.

In response, members of the bank's medical staff and management are to attend a course on the effects of VDUs on eyesight to be held by the Institute of Ophthalmology in London (CW, February 23).

MICRO NEWS

Edited by Martin Banks

Hoskyns' hotel pack set for US launch

THE Hoskyns' Hotel System, which started its public existence six weeks ago with an order for a total of five systems for Holiday Inn hotels in this country, is to be sold on the US market through Hoskyns' parent company, Martin Marietta.

And although the company would not comment officially, it is thought to be actively considering options for covering the European market as well.

Hoskyns now holds firm orders and options for over 30 of the Intel 8080-based Hotel System, with two further multinational hotel chains joining Holiday Inns in placing orders.

According to Hoskyns' marketing director, Richard Holway, the Hotel System was a good example of how microsystems could be exploited in a commercial environment, once a definable market sector was identified.

In the case of the Hotel System, the market is the large number of hotels that fall within the 60 to 300 bed range, although the system is capable of coping with hotels with larger numbers of beds.

The system is designed to provide all the necessary "front office" functions of a hotel, in terms of reservations, guest accounting, and administration. To add to this, the company is also working on software to cover the "back office" functions of stock control and ledger work.

To expand its facilities, the company has also worked out the necessary interfacing between the system and Minster Automation's Tiger telephone charging system to enter telephone calls onto guest accounts automatically.

Currently, this data is added in the same way as the rest from the hotel, bars and restaurants, through specially developed terminals that use simple numeric keypads to enter values and product code numbers.

One of the novel features of the system is that the central processor and floppy disc storage elements are located in a reworked filing cabinet

Huckfield (left) is shown the MP Experimenter by Navabi.

Minister sees ERA's MP...

ON a visit to the Leatherhead laboratories of ERA a Department of Industry parliamentary under secretary, Leslie Huckfield (Lab, Nuneaton) was shown the MP Experimenter by one of its developers, Chris Navabi.

Despite its name, the MP Experimenter has nothing to do with members of parliament but could be useful to any computer layman wishing to acquire a basic appreciation of how microprocessors work and how to use them.

Built at Stuttgart, West Germany by the ITT subsidiary Standard Electrik Lorenz, and sold here by ERA, the MP Experimenter comes with an extensive set of course notes that guide the user through a series of 30 experiments designed to teach him about microprocessors, starting at the logic gate level.

Configured around an Intel 8080, the MP Experimenter costs £300 in its basic form which provides the user with the facilities to perform all the experiments but not for the final part of the course. This involves using the Intel 8080 instruction set and requires a hexadecimal keyboard and display which can be provided for an extra £200.

Finding way in exhibitions made easy

FINDING one's way round large exhibitions is usually one of the more tedious ways of spending a day, and the US electronic components exhibition, Wescon, to be held in Los Angeles next month, is usually one of the larger shows.

To offer succour to the visitors to the show, and to gain just a little self-promotion as well, Warren Point will be using a version of its London Underground routefinder on its stand at the show, re-programmed to point the way round the exhibition.

Warren Point, which will be part of a large UK contingent of exhibitors at Wescon, have installed the Routefinder for London Transport at the new Heathrow Airport station at the end of the Piccadilly line.

It provides routing information for travellers on every station on the Underground network, from the starting point at the Airport station. The information is available in five languages.

South Korea link for AMI

US semiconductor manufacturer American Microsystems Inc, of Santa Ana, California, is planning a $10 million equally owned joint venture company in South Korea. AMI's partner is Seoul-based Gold Star Co, a manufacturer of domestic appliances and electronic entertainments, and the new company will be called Goldstar Microsystems Inc.

AMI will design the integrated circuits for use in Gold Star's products. Production is planned to begin in mid-1979 and the company should provide jobs for 500 Koreans.

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TUC to debate the impact of micros

By Robin Webster

CONCERN over issues raised by the impact of information technology, including employment, have been highlighted by resolutions tabled for the TUC Congress in September (CW, August 3).

The resolutions split the problem into two main areas: the need for the creation of a well-defined government policy towards information technology to allay trade union fears over unemployment; and the importance of setting up an indigenous microelectronics industry.

The Society of Civil and Public Servants, for example, has called for greater TUC pressure on the government to develop a viable employment strategy that matches the rapid incursion of information technology into industry.

"The SCPS has concluded that there can be no opting out of the microprocessor development field," said Campbell Christie, deputy general secretary of the SCPS. "We are going to have this industry and therefore we are going to be affected by the development of systems using microprocessors.

"We are most concerned with the social implications, however. For example, the Civil Service is already using word processing systems and these will have a fundamental effect on the employment of secretaries.

"The 'electronic office,' with facilities such as electronic filing and electronic mail, is possible. The consequences for employment are horrendous."

The SCPS has proposed that steps be taken by the government to ensure that there are enough trained people to meet the manufacturing requirements of both hardware and software fields.

On setting up a UK microprocessor manufacturing capacity, Christie believes that it is imperative for the government to go beyond the National Enterprise Board's initiative in setting up Inmos, its venture into semiconductor manufacturing, and that the TUC could play the role of catalyst.

"Something positive has to be done about the introduction of the microprocessor," he said. "It is not simply a further development of the computer." It is much more fundamental; it is as significant as the development of the steam engine or electricity."

In a similar resolution, AUEW/Tass supports the SCPS view. "The prerequisite is a publicly-owned home electronics industry and the setting up of preferential procurement policies," said Ian Benson, a divisional officer for Tass, and chairman of the NEDO working party.

"With this we can then phase in new technologies. Now that we have a State-funded manufacturer in the NEB's Inmos venture, if any US companies went to get into the UK as a market area, they should have to use Inmos as a second source.

"Inmos goes some of the way, but it should be built upon," he added.

Representing 125,000 Post Office maintenance engineers up to supervisory levels, the Post Office Engineering Union cites the forthcoming introduction of the Post Office's System X, and its current TXE 4 installation as an example of the "industrial consequences" of new technology.

Commenting on the TXE 4 and System X worries, a spokesman for the POEU said: "There could be some major problems when the Post Office introduces these systems into the network and, while a lot of money is being spent on System X research, the human side of the situation seems to have been ignored.

"The Post Office has nobody who is concerned with the industrial relations problems that may arise from the implementation of such technology."

The Post Office, however, denied that this was so and said that while there was no one person or department set up to deal with the problem, "positive assurances" had been given to the engineers on job security.

"We have guaranteed their jobs for five years ahead," said a PO spokesman, "and this agreement will be updated at yearly intervals."

Other resolutions on these topics have been tabled by the National Union of Bank Employees which urges the TUC General Council to produce a report on the "structural unemployment precipitated by these particular innovations (automation and computerisation)"; APEX, the Association of Professional, Executive, Clerical and Computer Staff which is seeking a one-hour reduction in the working week each year for the next 10 years until the 30-hour week has been attained; and the Union of Post Office Workers, which also calls for a shorter working week.

Extended memory

ADD-DN memory for the DECsystem-2040, 2050 and 2060 mainframes has been introduced by Ampex which allows users to expand their main memory from the Digital Equipment limit of just over a Megaword to 4 Megawords. The DECsystem-20 is a 36-bit word machine.

Ampex offers the 750 nanosecond memory in 128K-word modules, and 512K-word costs $120,000.

Speeding the ambulances

Computer-aided ambulance scheduling is being used by the South Yorkshire Metropolitan Ambulance Service in arranging over 2,000 ambulance journeys a day for the Doncaster, Barnsley, Rotherham and Sheffield areas.

The £40,000 system, which features a Data General Nova 3 minicomputer and six ADDS Regent VDUs, supplied by Terminal Display Systems of Blackburn, provides schedulers with access to a constantly updated file on hospital and patient information, and is expected considerably to reduce the normal scheduling time.

Based at a purpose-built centre in Fairfield, near Sheffield, the system will also provide hospitals and clinics with a daily log giving advance warning of patients' arrival.

● Our picture shows an ADDS Regent 100 VDU being used by a scheduler at the South Yorkshire Ambulance Service.

Japanese relax guidelines

AS forecast last year (CW1, November 10, 1977), MITI, the Japanese Ministry of International Trade and Industry, is to relax its rigid guidelines for the national computer manufacturers.

Miti is responding to foreign criticism of its policies, but also accepts that its rigid direction of the industry has been only partially successful. It will now take a back seat.

A significant failure has been the "shot-gun marriage" between Fujitsu and Hitachi which was intended to force the two manufacturers into close collaboration but has in fact resulted in Fujitsu and Hitachi competing as fiercely with each other as with IBM.

The enforced marriage between NEC and Toshiba was marginally more successful, but came too late to save Toshiba, which has now thrown in its hand and ceded almost all its mainframe interests to NEC in return for an equity stake (CW, July 27).

LETTERS TO THE EDITOR

Involve the user at all stages

THE Focus piece on charging-out (CW, July 27) has annoyed me both as a 13-year DP man and as a purveyor of project management systems. Most of the DPMs I speek to are including a charge back mechanism in their time recording systems because they realise that "if a company requires a new application then it must be of value" is just not true.

Users often request a new system with scant regard for the effort required from the DP area. With a large number of installations below strength in systems and programming, the user and DP should first justify that a new system is viable, investigate all possible alternatives and realistically estimate the total development costs, before commitment of precious DP resources is given.

Having agreed to the cost and timescale of the development the user should be informed of progress, and what better mechanism than time (man/woman and machine) recording with cost breakdowns and charge back details for the user?

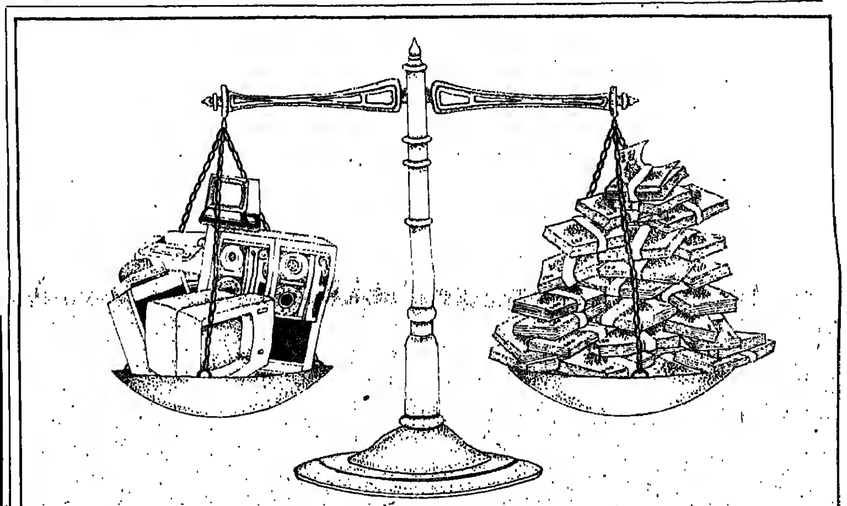
If DP involves the user at all steges it will get his commitment, enthusiasm, acceptance and subsequently his money because he is satisfied.

R. J. BAKER
Marketing Menager
ASI Management Services Ltd,
London.

Complex

ARNE RHODE (Letters, July 27), disappointed me. Describing himself as Complex he omitted to include a middle initial: surely this should be "I". Perhaps, as an electronic engineer, he can be forgiven as he probably uses the imaginary.

KEVIN J. O'MARA
Thurston Software Consultants,
Stansford Aerodrome,
Essex.



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PEOPLE

Unilever Executive for data services

AN executive to control the data services division has been formed at Unilever Computer Services. It will be chaired by Len Rawle, who is chairman of the company.

Head of national marketing Ronald Bain; Ray Tee, who is head of Unilever marketing, and Fred Moyden, head of the computing division, are the other members of the executive.

Bain joined UCSL soon after its formation in 1970, from Plessey, and was appointed national sales manager in 1973.

A founder member of UCSL, Tee was the first account manager and became sales manager in 1873. Moyden is also a founder member, and was operations manager of the Unilever Research Laboratory before becoming head of the computing division.

Appointed data services development co-ordinator with UCSL is Roger Tomlinson, previously in sales. He joined the company in 1870 from the University of Aston where he was a lecturer in Maths and Computing.

Rawle Moyden Bain Tee

New address for IDPM

This week the Institute of Data Processing Management moved into its new central London headquarters at 12/13 Henrietta Street, WC2. The offices have no telephones because of the overtime ban and work to rule by Post Office engineers, and for the time being the Institute may be contacted via the former DPMA offices at Maidenhead, tel 0628 29879.

Harry Secombe took the pictures at the wedding of his nephew Stan Secombe to Madalina Barrance in Hanwell, Middlesex recently. Also in the picture is Stan's father Fred, who officiated at the ceremony. Stan is a programmer at the Metropolitan Police office at Putney.

Photo The Ealing Gazette

Bob Horrobin, Mike Bromley, Tony Burgess, Gopal Brar and Jim Barnes are the directors of Pentagon Computer Services, a software house recently formed in Winsford, Cheshire. Horrobin was previously a senior project manager with Dataskil; Bramley and Burgess were consultant programmers with Arc Systems; Brar was a programmer with Data Logic; Barnes was a freelance consultant.

Alan Fagg, previously a district sales manager in the desk-top systems group at Hewlett-Packard, has joined Engineering Computer Services as sales director.

Bill Bignell of Four-Phase Systems has been promoted from Southern region salesman to sales manager in the UK.

Anthea Ballam has joined A. B. Saunders, the data processing PR consultants, as a press and PR executive. She was previously press officer of Univac, and before that was a writer with Computer Weekly.

Bernard Smith, previously a salesman with Data Sciences International, has moved to Logabax as a salesman in the North of England.

Michael Causer becomes engineering manager of Compeda Inc, the US subsidiary of Compeda. He was previously with Isopipe Ltd. Raymond Kush has been appointed technical representative, based in San Francisco. Formerly he was general manager of Apollo Technology Inc.

David Rhys-Davies has joined Jenson Computer Services as project leader for the implementation of a stock control system. He was previously a systems analyst at Green Shield. Programmer Bill Patharam becomes technical project leader for RSTS/E support and for AXXESS, RECMON and MENTOR.

Promoted from systems analysts to project leaders are Dave Kearns and Andrew Brown. Kearns has responsibility for a stock control system for oil rig support, and Brown will cover a turnkey order entry/ledger system.

Trainee programmer Chris Mathews has been promoted to analyst/programmer, specialising in Jenson's accountants' packages, and Dave Nuttall, formerly a programmer with Racal Redac, has joined Jenson, also as a programmer.

Brown Kearns

Robert Bevan has become director of North American sales with MSI in the US. He was previously a regional sales manager with the company. Aubrey Easterlin has become director of major account sales with MSI.

Helen Hackett has become personnel manager with Atkins On-Line. She will set up a personnel function following the company's takeover from the Atkins Group by On-Line Systems. Previously she set up the personnel department for the Rapid Results College.

Two product marketing appointments at Atkins On-Line are those of Richard Arkle, who was formerly in sales and marketing with Rank Xerox, and John Clare, previously a sales executive with ADP Network Services.

Clare Hecken

Rex Nelson has become a director of the Exchange Telegraph Company (Holdings), Extel's parent company. He is a director of the Exchange Telegraph Co, a subsidiary, and general manager of its engineering division.

AUGUST 21-24
Operational data security workshop. Operational Data Security Corp. City University, London EC1. Register August 18: 01-253 4399, ext 347.

AUGUST 21-25
Cybernetics and systems fourth international congress. World Organisation of General Systems and Cybernetics. Amsterdam. Details Dr J. Rose, College of Technology, Blackburn, tel: 0254 54321.

AUGUST 22-25
Conference on parallel processing. IEEE Computer Society/Wayne State University, Bellaire, Michigan, USA.

AUGUST 23
Meeting. VM UK and Ireland Users' Group, Maidenhead. Details from Iain Stinson on 01-839 8111, ext 2700.

AUGUST 23-25
Siggraph 78, fifth conference on computer graphics and interactive techniques. Association for Computing Machinery. Atlanta, Georgia, USA.

AUGUST 28-SEPTEMBER 1
Eighth Australian Computer Conference, Australian Computer Society, Canberra.

AUGUST 29
Jackson design technique, management tutorial. Marcus Bromberger. Dept of Computer Science, University of Strathclyde, Glasgow. 9.30. Details from the Continuing Education Office at the University, tel: 041-552 4400, ext 2132.

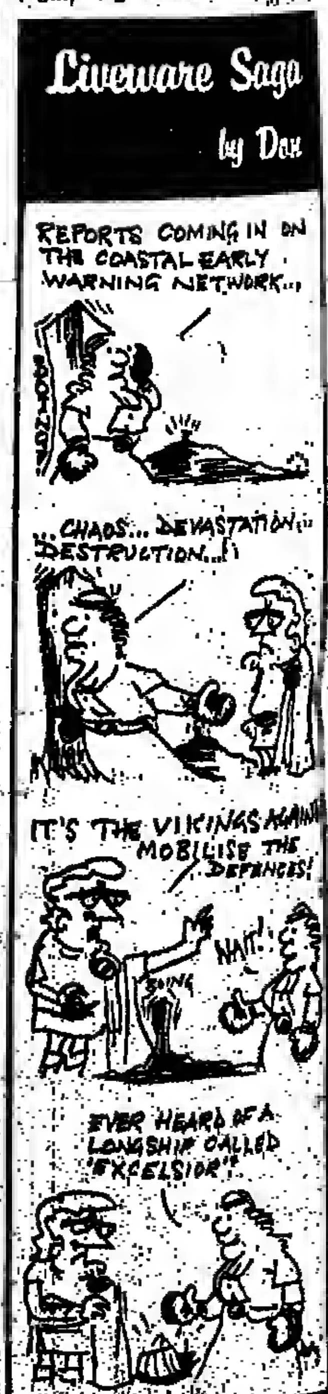
SEPTEMBER 4-8
Medical Informatics Europe, congress. European Federation for Medical Computing, Cambridge.

SEPTEMBER 5-8
Compcon Fall 78, IEEE Computer Society, Washington, DC.

SEPTEMBER 11-12
Non-invasive cardiovascular measurements conference. NASA/Stanford University, Stanford, California.

SEPTEMBER 12
Computer programs for project control, seminar. Association of Project Managers. Waldorf Hotel, London WC2. 10.00. Details APM, 01-799 8182.

Liveware Saga by Dan



We're having a Ball!

COMPUTER WEEKLY CHARITY BALL

Friday October 13 at the Royal Lancaster

Computer Weekly is holding its third annual Charity Ball. Last year more than 600 people attended what has come to be regarded as the computer industry's big night out.

This year the Ball will again be held under the patronage of the British Computer Society, on the eve of the Society's 21st Birthday.

Proceeds will once more be devoted to a charitable cause within the computer industry. So why not help us to help others, and at the same time enjoy a pleasant evening with friends and colleagues.

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NEWS IN BRIEF

Complaint withdrawn

THE shift controller, Mr David Finan, who was taking Northern Gas to the Industrial Tribunal on the grounds of unfair dismissal has withdrawn his complaint, for personal reasons. Mr Finan was sacked (CW, July 13) for printing biorhythm charts on the Northern Gas computer.

Stamp system

STAMP dealers Stanley Gibbons are using a 96K NCR I-8250 computer with four VDUs and 20Mbytes of disc store to keep tabs on 50,000 stamps, coins, medals, maps and share certificates which move constantly between four shops, eight security centres, worldwide exhibitions and customers. The £57,000 system will also be used for routine accounting.

Turnkey contract

AUTOMATION for Whitbread's new Magor, Gwent, brewery will be provided by Logica under a turnkey contract worth over £250,000. The project is expected to take about nine months. The system is based on a Digital Equipment PDP 11/60, running under Logica's RPMC automation package, and also includes GEC Media data acquisition hardware and Ulbrich intelligent video terminals from West Germany.

Silence schemes

SCHEMES for the leasing and hire purchase of business machine silence covers have been introduced by the Power Equipment Co of Kingsbury Road, London, NW9. The rates start at about £3 a month.

For Finland

THREE hospitals in Finland have acquired X-ray scanners from EMI: two head scanners and one whole-body machine. One head scanner is operating as part of the private health service at a Helsinki hospital, and the other two units are at the universities of Helsinki and Turku.

Basic tutor on Pet

A TUTORIAL program for Basic is available from Commodore for use on the Pet computer. Supplied on a cassette tape for just £9, "Basic Basic" is an interactive tutorial system intended to introduce beginners to Basic programming. It includes fifteen chapters, six sample programs, and "homework" assignments.

Diana sets up software house in front room

COTTAGE industry computing is on the up and up. A Bradford housewife, Mrs Diana MacKay, has installed £2,000-worth of microprocessor hardware in her front room, modified her television to make it into a display, and set herself up as a software house. Her prospective customers are mainly small businesses needing mailing systems, stock control systems, and payroll packages.

Mrs MacKay's hardware is a SWTP micro system, which is based on the Motorola 6800 processor chip, together with a Midwest Scientific floppy disc drive. She writes all the applications software in Basic, using a disc operating system supplied by Midwest Scientific.

One of her first contracts was for a system to handle a mailing list of 35,000 names and addresses, together with customer data, producing labels on a Centronics printer. Another early product was an information retrieval system that could find any one of 1,000 records stored on the floppy disc within three seconds.

Diana Mackay is 34 and has a five-year-old son and a ten-month-old daughter. She took an MSc in computer science at Bradford University and has worked as a programmer and a systems analyst for various firms in South Africa and London. She has called her firm Microsoft (not to be confused with CAP Microsoft Ltd) and feels there is an ample market for her wares.

She asserts that micros are so cheap now that people will not want to pay big consultancies' prices for software.

"I am confident that the business will come," she says.

Her service, she continues, "will particularly benefit the smaller businessman who cannot afford the outlay for a large computer but wants things at his fingertips."

TI bubble memory terminal sales soon 'off the shelf'

BECAUSE of the heavy demand for the Texas Instruments bubble memory terminals, the 763 and 765, which were introduced last spring (CW, April 28, 1977), there has been considerable delay in meeting orders in the UK and supplying potential customers with machines for evaluation. In the US terminals have been available for some time for immediate delivery but in the UK no orders have yet been fulfilled.

Now, however, David Monk, UK marketing manager for the European Digital Systems Division, says supplies are coming in and he expects to be able to clear most outstanding orders over the next month or so. New customers are likely to have a four to eight week wait but it is hoped that in about six weeks sales will be virtually off the shelf.

Monk says Texas has received some lucrative contracts worldwide for the terminals and that there is a large number of active prospects in the UK involving several hundred terminals.

The two terminals, the first products on the market to incorporate a bubble memory device, cost about £2,000 each with considerable discount for bulk orders. The 763 weighs 13lb and the 765, with a built-in acoustic coupler, 17lb. Both units, designed as portable terminals, can have up to 80K bytes of non-volatile memory and software, stored on ROMs, includes a text editor and a file management system.

Paperback chase

BRITAIN'S thirteen leading paperback publishers have joined together to sponsor a computer-based system for keeping track of paperbacks in print.

The Paperback Stock Control System, to be developed and operated by the Gordon & Gotch Computer Group, will supply booksellers with a master card file describing all current titles. It will be updated monthly with additional cards for new titles and a printed report detailing changes to existing titles.

NPL prepares new network plans

By Tim Palmer

WITH its pioneering internal packet-switched network fully loaded, the National Physical Laboratory in Teddington, Middlesex, is considering collaboration with outside organisations to create a new system, possibly based on the International X25 packet-switching standard.

The present NPL network was designed and developed in-house, and made significant contributions to the basic technology of packet-switching. The NPL is considering whether to develop the new one independently, or in collaboration with someone in industry.

Possible collaborators would include Logica, which has experience in packet-switching, GEC Computers, which has shown a growing interest in networking as the Post Office's Experimental Packet Switched Network EPSS has progressed, Ferranti, whose Argus 700 computers are used in EPSS, and Plessey, which has had considerable networking experience, much of it on Digital Equipment minicomputers.

The present NPL network is perhaps best known for the Scrapbook information retrieval system to which it provides access throughout the laboratory. This was developed by NPL on a CTL Modular One minicomputer, and the software is now marketed by Triad Computing Systems, and has been sold to the EEC Commission, where it is running on a Siemens 7.738 mainframe (CW, March 3, 1977).

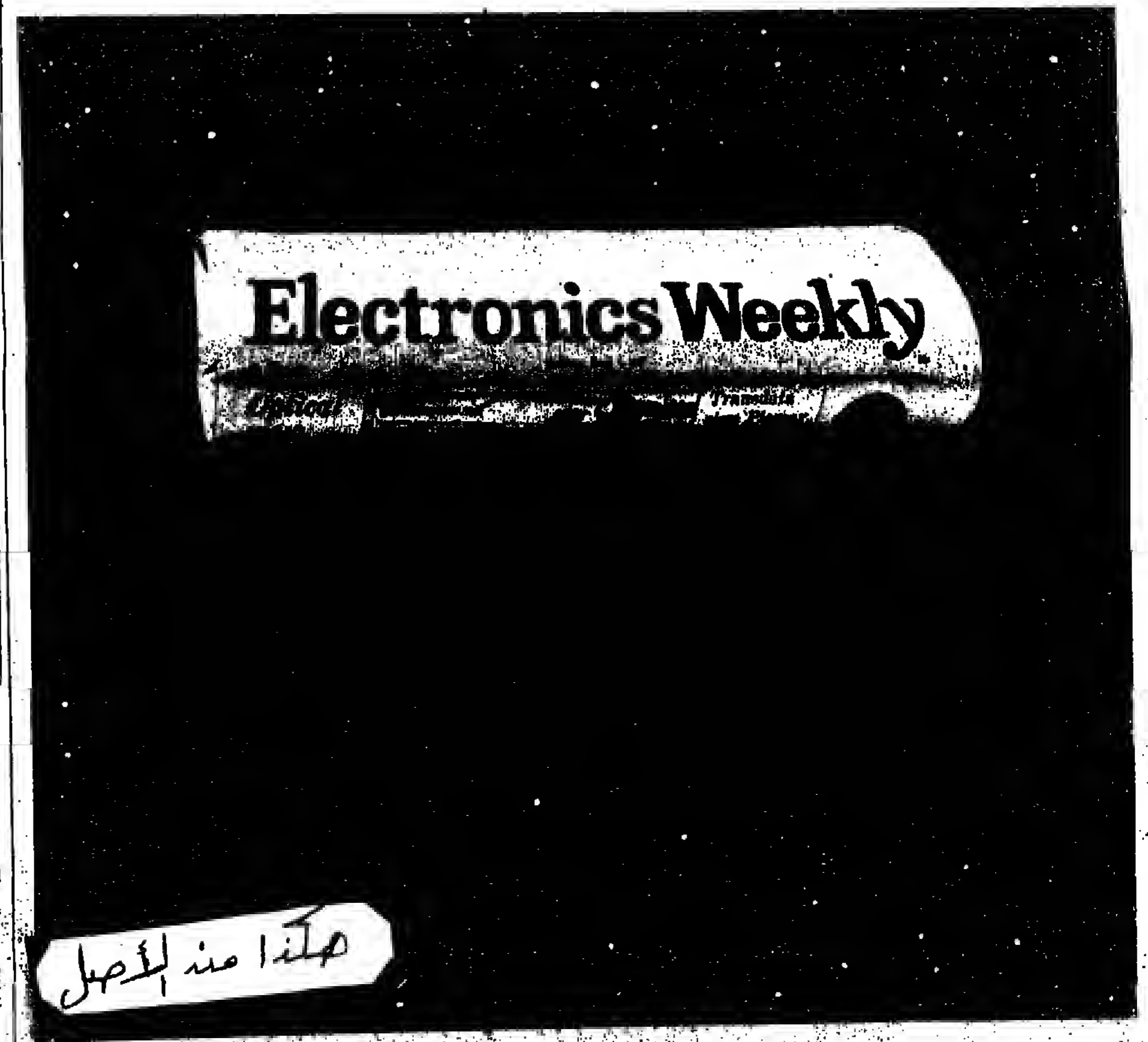
The NPL network is controlled by a Honeywell 516 minicomputer with a second on standby, and currently has 30 different machines on it, including almost every model of the Digital Equipment PDP-11 range except the largest.

As well as Scrapbook, the network is extensively used for the NPL-developed Edit interactive service for laying out text.

A facility has been developed to enable broadcast Teletext services to be displayed on a computer terminal, and the network has been used in several pioneering experiments on interconnection of packet networks.

Amdahl 470V/7 for Canada

THE first order announced outside the US for an Amdahl 470V/7 supercomputer has come from the Canadian government, which will pay $4.8 million for the machine. The V/7 is significantly more powerful than IBM's top-of-the-line 3033, and is to be installed in the taxation office of the Department of National Revenue and Excise in the Canadian capital of Ottawa. The first V/7 built is on its way to Western Electric in Illinois, and another will be delivered to American Airlines in Oklahoma shortly (CW, August 3).



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Four-day seminar next month

Tricket

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Machover

Carl Machover, Bert Herzog, Derrick Grover and Keith Tricket will, with others, present the latest trends and achievements in graphics hardware, software and applications, in the US and the UK, at a four-day seminar staged by Online at the Regent Centre Hotel in London from September 12 to 15. Full details are available from Online, Cleveland Road, Uxbridge, Middlesex. Tel: (0895) 39262.

Here Sydney Poulden reports on the rapidly expanding market.

'Market explosion in graphics has begun'

By Sydney Paulden

"THE market explosion in computer graphics, that so many people had hoped for, has now definitely begun."

That is the firm conviction of Carl Machover, one of the leading graphics specialists in the US.

He backs his opinion with figures. "In the last 18 months the market has expanded so that most manufacturers in the field have had over 100 per cent growth in that time. I'm not talking about small companies just getting started. You would expect them to grow rapidly. No, I'm talking of companies that have pushed their graphics turnover from $16 million to $35 million. That is significant."

Machover is president of Machover Associates, a graphics consultancy, consulting editor of Computer Display Review and a former president of the Society for Information Display.

To clinch his argument, he points out that IBM has now come to the conclusion that the computer graphics market is big enough to demand its full attention. He reports that within the past year, IBM has taken on the marketing of CADAM, a system developed by Lockheed, and in October will be launching a new graphics display console, the 3250.

It is microprocessor technology that is revolutionising the view of graphics. Lower manufacturing costs [illegible] the hardware available for a much wider range of applications; demand is therefore increasing, and it is becoming more and more economic for production of graphics equipment in volume.

"Anyone planning new facilities or any manufacturer in the computer field thinking of new products must now consider the graphics field," claims Machover.

It used to require an investment of $150,000 to get started in graphics in a scientific or engineering computing environment, but it can now be done for $60,000.

Prices of some equipment are bringing graphics into the scope of the home-brew, do-it-yourself computing arena. One graphic tablet on the market permits the amateur to use a scribe to create any kind of design on his own TV screen at home, in colour, for only $1,000.

While such progress has been made in hardware, the graphics software experts have not been slacking in the US. There have been important moves to rationalise software creation in order to make it more economical to apply packages on different types of equipment.

"The problem with software," explains Bart Herzog, "is that each person in the field has had to keep on reinventing the wheel. Now, we are getting to the point where graphics software will be much more machine-independent and packages will be that much more mobile and, consequently, cheaper."

Herzog is director of the University Computing Centre at the University of Colorado, where he is also Professor of Electrical Engineering and Professor of Computer Science. His up-to-[illegible] software scene comes from his appointment as co-chairman of the ACM SIGGRAPH Graphics Standards Planning Committee. The committee has produced a draft proposal for a draft standard.

"We are not a standards organisation, so we cannot draft standards," he says, "but we can make proposals to standards organisations. We have developed a terminology for graphics programs that could result in huge savings in time and money. If these are accepted internationally, then programs could move easily within a country and across frontiers, independent of the hardware."

Herzog has gained experience in implementing the standards proposals, and will shortly be in the UK to describe his results at the Online seminar.

The new generation of low-cost graphics units will certainly stir the British market in the near future. According to Keith Tricket, managing director of Compeda, the NRDC marketing support subsidiary, Britain can teach the Americans a thing or two in graphics software.

"Because of the shortage of cash for computer power," Tricket points out, "we British have had to use smaller computers more cleverly." He cites several examples of graphics packages with really viable commercial, engineering and scientific applications that have been developed in the UK and are in advance of anything comparable in the US. There is the interactive graphics system ICON, being used for the design of the lattice structure of oil rigs; Gaelic, a new system for integrated circuit design, devised by the Wolfson Microelectronics Liaison Unit at Edinburgh University, and a superb example of British software ingenuity is PDMS — the plant design management system.

Dr Keith Pike, one of Tricket's colleagues at Compeda, says of PDMS that it is "much more than an automatic pencil for the design of pipeline layout." It allows the designer to construct 3-D representations of every component in a plant, down to the flange and gasket level. All the data is held in store, so that not only can the user specify a view from any angle, any direction and any eye level, but data can be collated and accessed for costing and for materials ordering. It is a valuable tool for storing data to be accessed years later, when the plant manager wants to introduce modifications to the layout, or wants to locate sets of components that have to be overhauled or replaced.

Darrick Grover, the NRDC executive with responsibility for licensing and funding graphics projects in the UK, is gathering together Tricket and Pike and others of the calibre of Professor W. S. Elliot of Imperial College, to ensure that the graphics progress made in Britain will not be overlooked when the American experts present their know-how at the Online seminar in September. "It could," says Grover, "be a case of the tail-enders wagging the dog."

ICL shares climb after good reports

A SECOND stockbrokers' circular strongly recommends clients to buy ICL shares, following an extremely bullish report on the company from Laurie, Milbank (CW, July 27). This has helped to push ICL shares through the 360 pence mark and they now stand at their highest point since the company was formed 10 years ago.

A. R. Bowden of Fielding, Newson-Smith, who wrote the latest report on ICL, has been an enthusiastic champion of the company for several years, and he told Computer Weekly he believes the company still to be undervalued.

Gerald Kelly, of stockbrokers Rowe Rudd, has few qualms about the shares either. "There is a fair degree of interest among institutional investors — pension funds, insurance companies, unit trusts — in ICL as a long-term investment," he told Computer Weekly.

The circular from Fielding Newson-Smith is particularly complimentary about ICL management.

"All the evidence points to the fact that Dr Wilson has taken over the managing director's role very successfully, and more so than one might reasonably have expected given the suddenness of the changeover."

The company's potential is set out in a table which suggests that turnover for the year ending next month could reach £493 million, doubling to £[illegible] million by 1982-83. Pre-tax profits should be about £37 million for the current year, and could reach £84 million by 1983.

No more hitches in Euronet switch

THE problems which have delayed the opening of both the French Transpac and European Euronet packet-switched networks (CW, August 3) lay in the CP-50 switch, developed by Philips subsidiary TRT under sub-contract from SESA of Paris. SESA, the main contractor for Transpac, is building Euronet in partnership with Logica of London.

"The problem has now been solved," a Logica spokesman told Computer Weekly.

"It was the typical sort of problem that one gets at the systems integration stage. It occurred when the standby switch took over from the main switch, as would happen when the main switch failed. Instead of shutting down, the failing switch continued to generate data, which corrupted the data in the standby."

The CP-50 switch is built up of three modules, each based on the Intel 8010 single-board microcomputer which is driven by the 8080. The three units are the Group Unit, handling level 3 of the standard X25 interface; the Synchronous Line Unit, for HDLC users; and the Asynchronous Line Unit, which handles character terminals.

Several line units can be attached to each group unit, and several group units can be attached to the high speed ring bus through which a minicomputer, in the case of Transpac and Euronet a SEMS Mitra 125, monitors the packet exchange.

This modular and flexible structure makes the CP-50 a particularly powerful device for packet-switching, probably capable of catering for a greater variation of traffic demands than any other solution currently available.

However, the fact that the Telenet Processor switches, which are also microprocessor-based, can be bought off the shelf and are already installed and working in the US and in London, makes it likely that the Post Office will select these for its forthcoming X25 network if the plan to get it into service late next year goes ahead.

BETA, the Business Equipment Trade Association, has poured cold water on the Post Office's plans for a public packet-switched service. In a submission to the National Committee on Computer Networks, BETA suggests that a packet-switched service would benefit only a minor sector of network users, and calls instead for a basic circuit-switched network on to which packet-switching could be superimposed as a value-added service. BETA also wants moves towards an all-digital (System X) telephone network to be speeded up.

● Speaking about Euronet in the Commons last week, Minister of State at the Department of Science, Gordon Oakes, said that the network would evolve into a pan-European public data transmission service. This has been canvassed as a likely development but not previously stated categorically. Traffic costs on Euronet will be less than £3 an hour.

Queen's Award applications

APPLICATIONS can now be made by companies wishing to be considered for Queen's Awards for Export and Technology 1979. Any UK based firm that feels it has made an outstanding contribution in either exporting or technology may apply.

Several firms in or close to the computer industry won Queen's Awards in 1978 (CW, April 7). Among these were Control Data, Plessey Telecommunications, and Marconi Avionics. British Rail won for export of computer consultancy services. There were 107 Export Awards in total, and 17 Technology Awards.

Closing date for this year's applications is October 31, 1978. Forms can be obtained from: The Secretary, Queen's Awards Office, Williams National House, 11/13 Holborn Viaduct, London EC1A 1EL; telephone 01-222 2277.

Something to celebrate at Pompey

WITH Pompey facing the bleak prospect of Fourth Division football in the new season, there is not much to cheer about down on Portsea Island these days. But one Portsmouth company doing a spot of justifiable celebration is Datasource (Computer Services) Ltd.

This small systems house, which has been in business only since 1975, has won the title of best performing Honeywell systems house for the first half of 1978.

Datasource beat five other companies to the award, the first of its kind, which covered the period January to June 1978.

"It is awarded on the basis of the number of systems sold in the period," a Datasource spokesman told Computer Weekly. "We won it this time by [illegible] orders during the period."

Datasource has only been marketing systems based on the Honeywell Level 6 mini, but has offerings right across the power range of the machine, concentrating mainly on the 6/36 and 6/43.

Although it is prepared to do turnkey systems, it is also entering two specialist markets: the building trade and solicitors' practices.

Datasource started out by doing sub-contract programming work, but decided to enter the systems building market last year. Its first arrangement was with Cincinnati Milacron, but after a couple of months, Cincinnati pulled out of the business, and Datasource signed up with Honeywell.

The award — half a dozen bottles of champagne and a citation — was presented at a gathering of Level 6 systems builders, and will be awarded twice a year.

Menzies introduces a new range of products

A CHANGE of name and a new product are features of a revitalised effort in the voice response data communications business for newspaper distributor John Menzies.

Previously called WDC Computers and responsible for marketing the Wavetek voice response system, the subsidiary has been renamed Menzies Communications Systems Ltd, and is introducing a new range of products in the UK, which come from Periphonics Corp of New York, a company 75% owned by oil giant Exxon Corp.

Menzies terminated its agreement with Wavetek of San Diego, California, because it decided the company's equipment was insufficiently flexible for future demands of the market.

The Wavetek agency was promptly snapped up by Racal-Milgo, which now has marketing rights for Wavetek products throughout Europe (CW, July 13). WDC installed Wavetek systems with a number of large companies, notably Menzies itself, Colgate-Palmolive and Smedleys.

Periphonics systems have been installed at 250 US sites.

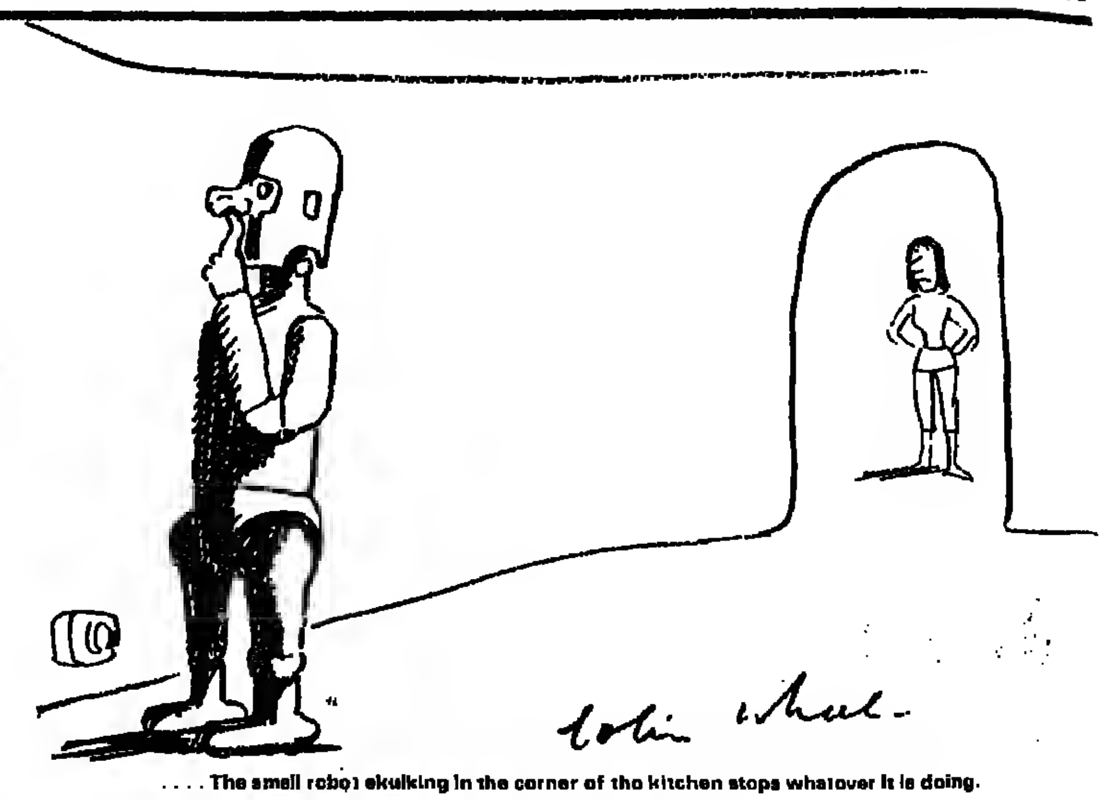
Hobbyists in London form a club

A NEW hobby computer club is to hold its inaugural meeting in October with the backing of the Department of Electronic and Communications Engineering of the Polytechnic of North London.

Calling itself the North London Hobby Computer Club, it will open to all comers in the North London area. The opening meeting will be on October 3, at 6.30 pm, in Room 47 in the Old Building at Holloway Road, opposite Holloway Road tube station.

One of the special prizes in the Datskil/Computer Weekly essay competition, Computerstyle 2000, was awarded to Anthony Thornton, of Derby, who works for British Rail. His winning essay appears below. In it he describes the projected lifestyle of one Jo Bradley who, having reached the age of 55, is to start a four-and-a-half day week, then four, three, ultimately retiring from economically active life at the age of 60.

The essay of the remaining special award winner, Paul Holden, of Dublin, will be published shortly.



. . . . The small robot skulking in the corner of the kitchen stops whatever it is doing.

'What would my Granny have made of all this..... computers waking me up, taking my orders for breakfast, supervising preparation of same.....?'

By ANTHONY THORNTON

"BRRR."
Silence.
"Brrr."
Silence.
"Brrr."

Jo Bradley opens his eyes, yawns and halts the sharp ring of the alarm with a spoken command. It is Monday morning, Monday April 23, Year 2000, time 8.00am, to be precise. Jo Bradley is reminded of these facts by the date/time display situated on the wall opposite. Turning to face the microphone by his bed head, he speaks deliberately.

"Break-fast-Em-Three."

"Accept," responds an anonymous monotone voice.

Jo turns back and smiles as he visualises the house computer directing the automatic handling device downstairs; the latter slowly traversing the racks in the kitchen until the pre-packed breakfast M3 is located, now transferring the aluminium container and retracing its path before gently placing the breakfast in the processor-controlled oven.

"What would my old granny have made of all this?" thought Jo.

"Computers waking me up, taking my orders for breakfast and supervising preparation of the same."

"You lucky creature!" he says aloud to his wife as he gets out of bed.

First in the bathroom, Jo decides to make use of his latest acquisition — a physical condition tester. He'd been pleased to add this capability to his house computer some weeks earlier. After all, he was in his 54th year and wasn't it a perk of his thriving business — selling, installing and maintaining personal computer systems — to reap the benefits of the latest hardware on the market?

"I'm not feeling quite 100%" he muses. Monday mornings never change.

Jo unhooks a speaker from the gleaming plastic cabinet.

"Jo-seff Brad-lee" he mouths, in the same tones he had used when ordering breakfast. A stored message flashed across the now illuminated visual display unit, prompting Jo to provide hair, blood, urine and exhaled air samples to the appropriate receptacle. Some minutes pass, while the results of analysis are digitised and communicated along with Jo's temperature, weight, blood pressure and pulse rate to his personal computerised medical record. One day, perhaps sooner, perhaps later, this information would be made available to the master NHS files. On this morning though, the system merely responds by displaying a mass of numbers, representing the results of Jo's current condition alongside weekly and monthly average scores. At the bottom of the screen, a message insists that Jo is not to consult his local hospital but is to swallow a vitamin B17 pill after breakfast.

Twenty seven minutes and 11 seconds after waking, Jo is just polishing off the remnants of breakfast M3, when he is joined by his wife Jan.

"Good morning, dear. Don't forget your pill" she teases, with a mischievous grin.

You shouldn't be reading my diary, he scolds, regretting the moment of passion when he had divulged the password which granted access to his personal information. One day, he swore, he'd switch over to the fingerprint matching security system, like that fitted to the locks on the doors of the house.

Jo notices the print-out, which his wife is perusing.

"You shouldn't be reading my diary" he scolds, regretting the moment of passion when he had divulged the password which granted access to his personal information. One day, he swore, he'd switch over to the fingerprint matching security system, like that fitted to the locks on the doors of the house.

Bending over his wife's shoulder, he scans his day's appointments. Just two straightforward installation jobs, left over from the weekend. Being Monday, there would be many more in addition to these on the files at his shop. Everyone, in theory, could send business messages direct to his home, but Jo would only allow this facility to special friends. He insisted on separating work and leisure. For Jo, home was leisure.

"Can you send 'sis' a birthday page?" Jo asks, noticing the relevant entry on the print-out. "One of those you made yourself."

With a fond farewell, Jo departs, leaving Jan to scan her small selection of greetings pages. Soon she halts the VDU on a display of English flora, quite appropriate for Jo's American sister. A swiftly composed message, and a matter of seconds would elapse, before the page would reside in the files of electronic mail 3,000 miles away, waiting to remind "sis" of the march of time.

On her second cup of coffee now, Jan calls up her favourite "visual newspaper." A dull set of headlines:

Politics — Results of your vote on last night's bill — p 101.

Sport — Glenrothes clinch place in European Cup — p 274.

Crime — Decrease in robbery, increase in fraud continue — p 382.

She moves the display down the hierarchy of pages to the Timesview crossword.

Today's winner — Lt Col Bird (retired) of Worthing in 7 min 41 sec.

"Some folks are setting a cracking pace this morning" thinks Jan, "best get started about the house . . . Andy!"

The small robot skulking in the corner of the kitchen near the electric socket, stops whatever it is doing and follows Jan into the lounge. Together they set about a variety of domestic chores — cleaning, bed making, washing, pressing and the like. Many younger women specified the day's tasks to Andy-like robots and left them to it. Jan had always found this process time consuming and preferred a co-operative effort. Besides, with an untidy husband like hers, Jan had found Andy's early attempts to discriminate refuse from valued articles quite disastrous.

Chores complete, Jan has the rest of the day to herself.

What to do?

Replenish stock of food. No warnings from the house computer, leave it until later in the week.

Spray weed killer on the lawn. Andy can do that.

Reset the decor on the lounge wall. I quite like our present lighting pattern.

Design some more dresses. Manipulating the light pen gets so tiring.

Play "scrabble" with the computer. Not today thank you.

Visit Mary.

Jo in the meantime is enjoying his drive to work. Having previously keyed his destination, his shop, into the car's transmitter, the system of submerged transponders is regulating and routing his journey-to-work through the city streets. He has time to reflect. Another year or so before he and Jan would enter a new phase of their lives — perhaps the greatest social benefit of all those attributable to the "era of high technology." At the age of 55, he will begin spending less time at work, at first a four-and-a-half day week, then four, three, ultimately retiring from economically active life at the age of 60.

Concurrent with this run down at work will be a phasing-in process of education as preparation for active leisure. Education — much of it acquired through the home computer terminal; in travel not transport, in art not accountancy, in crafts not chemistry, in music not mathematics, in recreation not rheology, for doing not dozing.

"Yes" thought Jo, "Gran did miss out on some things."

The shop is a large and roomy property near the city centre. Jo believed it had seen service as a supermarket in the past, but now it is alive with working demonstrations of computers and associated equipment, which Jo sold to the general public. Nodding to his counter staff in passing, Jo picks up the print-out detailing the day's installation and maintenance requirements. Selecting the two tasks he had seen earlier, he delegates the remaining dozen or so to his partners.

"Starting your active leisure early," quips one.

Jo grins somewhat self consciously.

Everyone, in theory, could send business messages direct to his home, but Jo would only allow this facility to special friends.

It is the middle of the afternoon before Jo is nearing completion of the second installation of the day — a microprocessor control system for his friend's greenhouse. Testing the system is somewhat amusing. Windows opening and closing as Jo shields the sunlight from first one sensing mechanism then another; water spraying as he wipes moisture from a third, hot air wafting past as the temperature falls; acidity on a further sensor triggers an alkaline drip; on another, an acidic one. He checks the graphic monitor, seeing that the parameters defining each plant's environment, disrupted by his actions, have been automatically restored to their preset control values. All seems well. Too late to return to work now.

Jan is a little surprised to see Jo home early.

"What did you do today?" he asks.

"I walked to Mary's . . . and back," Jan looks pleased with herself, her normally pallid complexion showing the welcome benefits of fresh air and exercise.

"And you?"

"Oh very busy dear," responds Jo, in a sardonic tone, "that's why I'm back early."

They settle to a light tea in front of TV in the lounge. One of those electronic mail-order sales programmes, which are so popular nowadays, is in progress. Jan is beginning to show interest in the clothes being modelled, and so is Jo, when a message, via telephone line and home computer terminal, appears on the lower part of the screen. Only messages from sources to whom Jo has assigned priority will effect such an interruption.

Squash court available, 7.30 pm.

"Shall we take it dear," Jo asks.

"Provided we have dinner at the club, afterwards," came the bargaining reply.

Jo does not need second bidding where squash is concerned. He is through to the club's reservation system in a matter of seconds, just pre-empting his friend with the greenhouse, although he does not know it. Court and dinner table reserved,

Many younger women specified the day's tasks to Andy-like robots and left them to it. Jan had always found this process time consuming and preferred a co-operative effort.

the Bradleys turn their attention to the menu in front of them. It does not take long to make their choice and transmit it to the restaurant. They often dine out these days, finding it both cheap and efficient compared to some years previously.

They prepare to follow hard on the heels of this last message.

It is Tuesday morning, Tuesday, April 24, year 2000, time 0.01 am, when two tired but contented souls climb into bed. Jo turns to the microphone by his bed alarm.

"Alarm, eight am," he commands, drowsily.

"Better make it 7.45," says Jan.

Nudge nudge, wink wink!

Mascot as standards?

● From front page

obliged to adopt it. A consultative document describing the new proposal is due to be published in a few weeks, according to informed sources.

Mascot (Modular Approach to Software Construction Operation and Test) was originally developed as an aid to applications development based on an Algol 68 environment. It was subsequently adapted to suit the UK standard for real time work, Coral 66, with the assistance of Systems Designers (CW, November 17, 1977).

The system currently includes a real time executive, a development and documentation methodology, and optional extensions to the official Coral 66 standard. Highly regarded by those who have used it, it is said to offer major advantages throughout the software design, implementation, and maintenance cycle.

The Mascot Suppliers Association, an informal grouping of those interested in or experienced with the system, already includes Systems Designers, Software Sciences, Scicon, and Logica on the software side, and Ferranti and Marconi as hardware suppliers.

An indication that more widespread use of the system is anticipated was provided by a lunch given in London last week by Infotech International. Intended to launch a two-day Infotech tutorial on Mascot scheduled for October, the meeting was attended by senior representatives from the Mascot Suppliers Association and from existing and potential users, including the British Aerospace Corporation and GEC Computers.

Guest Chesslab

By John Roycroft

THE task was simply this. I was presented with three positions known to be won for the side with the rook in a battle against a lone knight, and I was to win them. The diagrams R1, R2 and R3 show the positions, and this is how the play went from each.

A few hours before Viktor Korchnoi made the first move against Anatoly Karpov in the well publicised World Chess Championship in the Philippines, a somewhat less highly charged confrontation took place in London between a sub-optimal chess player and an optimum database. Only four chessmen were on the board set up at Queen Mary College, Mile End, when John Roycroft took up the invitation of Donald Michie to compete under tournament constraints against an end game program (CW, June 22). Michael Clarke acted as arbiter, operating the teletype terminal, while Donald Michie was observer. Here, John Roycroft himself reports on the contest.

Some of the names of the chessboard squares used in the algebraic notation are shown in Diagram 1. Readers should have little trouble filling in the gaps. K=king; R=rook; S=knight (Why S for knight? Kt, used to avoid confusion with K, is clumsy and N is shared with no other country. S is for Springer, the German for the chess piece.)

John Roycroft describes himself as a generalist working for a leading multinational manufacturer of hardware and software. He has published a book on end game studies, Test Tube Chess, 370 pages, 470 diagrams from the author at £4 plus 54p postage (a No 2 Jiffy bag will speed delivery). Roycroft also edits a quarterly magazine, EG, which is devoted to the same subject. The annual subscription is £4 and details may be had from A. J. Roycroft, 47 New Way Road, London, NW9 6PL.

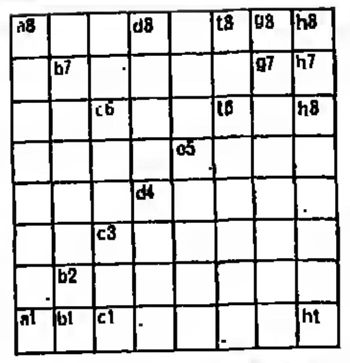


Diagram 1

R1

1.	Rb3	Ka5
2.	Kc7	Sf2
3.	Kc8	Ka4
4.	Rf3	Sd1
5.	Kc5	Sb2
6.	Rh3	Sd1
7.	Kc4	Sb2+
8.	Kc3	Ka3
9.	Rg3	Sa4+
10.	Kc4+	Ka2
11.	Rg5	Sb2+
12.	Kc3	Sd1+
13.	Kc2	Se3+
14.	Kd2	Sc4+
15.	Kc3	Se3
16.	Re5	Sg4
17.	Re8	Kb1
18.	Kd2	Sf2
19.	Rb6+	Ka2
20.	Rb4	Sh1
21.	Rg4	Ka3
22.	Ke3	Kb3
23.	Rg1	'resigns'

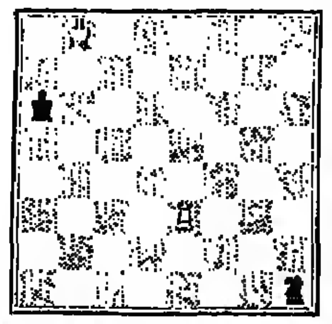
R2

Ke5	Sa4
Rh7+	Ke8
Kd6	Sb6
Rh8+	Kf7
Rh4	Sc8+
Kd7	Sb6+
Kc8	Sc8
Rh7+	Kf6
Rh6+	Kg7
Re6	Sa7+
Kd8	Kf8
Kd7	Sb5
Re3	Sd4
Re4	Sb3
Kd6	Kg7
Kd5	Sd2
Rf4	Sb1
Rf3	Kg6
Rd3	Kf5
Kc5	Ke4
Kc4	Ke5
Kb4	Ke6
Rd1	'resigns'

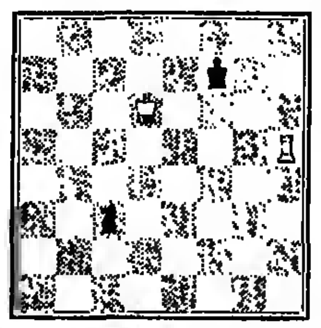
R3

Ke7	Kg7
Ra3	Kg6
Ke8	Sc2
Rg3+	Kh5
Kf5	Kh4
Re3	Se1
Kf4	Sg2+
Kf3	Kh3
Rh3	Sh4+
Kf4+	Kh2
Ra5	Sg2+
Kf3	Se1+
Kf2	Sd3+
Ke2	Sf4+
Kf3	Sd3
Rd5	Sb4
Rd6	Kg1
Ke2	Sc2
Rg8+	Kh2
Rg4	Se1
Rb4	Kh3
Kd3	Kh2
Rb1	'resigns'

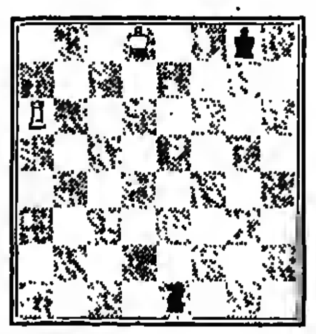
Fine fight with no histrionics



R1: White to play



R2: White to play



R3: White to play

In all cases White captures the black knight on his 24th move.

Question: Was this a straight contest between chess player and computer?

Answer: No. True, I did play with a clock (at the rate of 16 moves per hour, the equivalent of tournament chess and its 2½ hours for 40 moves), and I did not have any moves back. On the other hand, I had had over a week's notice of the positions, and naturally I prepared for the contest. In chess terms it was more like having an adjourned game.

Q: How did you prepare?

A: I was already familiar, without being move-perfect, with what the books give on this ending. Then, I had learned a lot from playing against the same database at the April two-day conference in Edinburgh (CW, May 25). Thirdly, I asked for, and was given in advance, four positions (and the single-line optimal play) with the same solution length as the contest positions, so that I could have some training that was relevant.

Q: I notice that the solutions are all 24 moves long. Why is this?

A: Professor Michie had them chosen at random from the 178 such positions, with the idea that the near-maximum length (no position has an optimal solution exceeding 27 moves) and the number of such positions would provide the tough- [illegible] tions.

Q: You played with a chess clock to measure your thinking time. How much time did you take?

A: In fact, about five minutes for each position.

Q: That's very fast, isn't it?

A: Yes. Or rather, it seems so. In fact, my preparation was pretty good, and most of the difficult moves I had already written down.

Q: You mean you had notes? That's not like tournament chess, is it?

A: Quite right. Not only did I have notes, but an auxiliary board on which I moved the pieces around when I wanted to before choosing the move to be played on the primary board. This was all agreed in advance. But I used the auxiliary board seriously only twice. The contest was between a chess analyst and a database, not between an over-the-board master and a database, so the conditions were deliberately made to ensure the analyst, myself, could not complain.

Q: Coming to the play, is not the solution to R3 very similar to that to R1?

A: Yes, it is. In fact, it's a mirror image, or almost, from move 5 onwards. We were all surprised at the lack of variety, certainly the apparent lack of variety, in the core of the solutions. Even R2 was like one of the positions given to me in advance, and the R1 and R3 lines were not new to me. But R1 and R2 are quite distinct from each other.

Q: So, were you not just reading from your paper database while the computer was reading from its magnetic one?

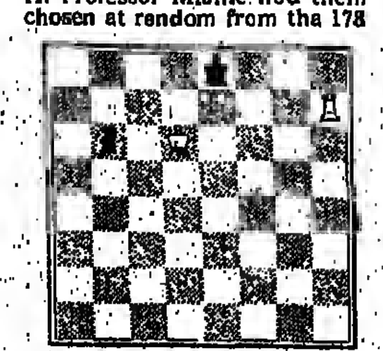
A: Almost. Of course, I had to be sure, and had to be able to recognise a similar position in any of its eight possible orientations under rotation and reflection. This was a mental, not a paper, process. And the program might have diverged, by selecting an alternative, equal-depth move at many possible branch-points, though it did not. But certainly, most of the work was in the preparation, and a great deal of the play was accidentally (not deliberately, anyway) to be found in the practice positions.

Q: Which of the three positions you played would you call the "best"?

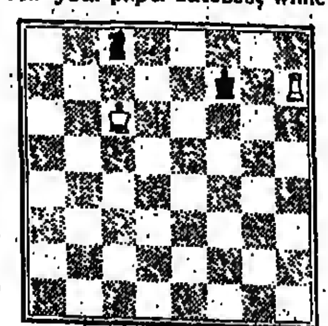
A: R2 is quite beautiful. And it won't be found in the textbooks. Take the position after Black's third move. (See R2.1) The black knight and black king are striving to meet, to set up a standard drawing set-up with both men next to each other on the edge. White has to play very precisely to prevent this. In fact, I find the next 10 moves a sheer delight.

Q: Can you be more specific?

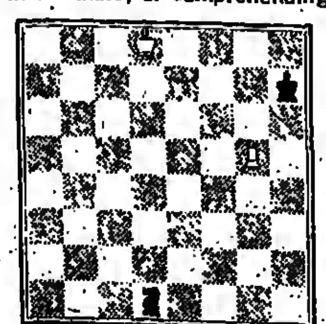
A: Consider the position after 8.Rh7+. (See R2.2). Where can Black play his king? If he goes to e8 or to f8, the knight is immediately lost to a rook check on h8. If he goes to g8, however, the rook plays to c7, winning the knight by domination, since it has no safe squares. The same applies to the move of Black's king to g6. So, in spite of the apparently wide choice, Black really has only e6 and f8 to choose from. But even e6 falls to Rh6+ and the variety of ways in which the knight is now caught in just a few more moves is quite delightful. So, really, only f6 will do for Black in R2.2. The effect, in the mind, of comprehending each of these variations individually, and all of the variations as a group, is strongly aesthetic.



R2.1: See text



R2.2: See text



R4: See text

Q: Was that the end of it?

A: Not quite. After R1, R2 and R3 had been disposed of, I asked for three more positions to be given to me without preparation. Here I would try to play fast, but with up to three moves back. A kind of compromise between over-the-board competitive play and how the analyst works.

Q: And what happened?

A: Exactly the same result. I made no mistakes (to everyone's surprise, including my own) and it was remarkably easy.

Q: How do you mean?

A: I assumed that the positions would transpose into solutions that I already knew — indeed, into the essentially different R1 and R2 lines or into one of the Edinburgh lines. And they did.

Q: What about an example?

A: Certainly, R4. It was not too difficult to find 1. Ke7 Kb5 2. Kf6 Se3 3 Re3 Sd1+ 4. Ke6 Sc7 5. Kf5 Se8 6. Rg8+ Kb5 7. Re6 and we're in R1, as near as makes no difference.

Q: How many moves back did you have in these three "unseen" positions?

A: None. It turned out, so Michael Clarke told me, that all the moves I made were optimal. That is, no moves I made prolonged the solution unnecessarily.

Q: What now?

A: Donald Michie thinks that it ought to be possible to construct an "expert system" that will play the ending in a non-look-up manner. He was interested in how I tackled the contest.

Q: And how did you?

A: By looking for patterns. For instance, the play in all these long-solution positions seems to fall naturally into three phases. In the first phase the chessmen are relatively dispersed, but Black must get his king and knight together, or perpetually threaten to. At the end of this we enter a second phase, the kernel of the struggle, where a sequence of a dozen or so moves decides it, because eventually the knight is forced away from its king. Phase three mops up the knight. Of course, mate threats operate in any phase of the struggle, even in all phases.

Q: This phase two is the most interesting?

A: I certainly think so. There should be a closer look at the database to verify our conjecture about the limited number (three) of distinct "second phase" move sequences. It will be very curious, but it seems a definite possibility, if the patterns of play are different with different solution lengths. To be sure of this will require a great deal of work.

Q: Why aren't all positions of the "maximum length" of solution?

A: What is most relevant is a position without antecedents or ancestors. The way the database was constructed, backwards from all terminal positions, ensures that the White moves are the best (win fastest) and the Black moves are also the best (delay the win longest, or seize a draw). This process, pursued for all possible positions, over three million, allows a table to be constructed showing how many positions exist for each possible length of solution. Consider diagram R1. It's White to play, so Black moved last. But, aside from the possibility of capturing some fifth man, there is no previous move available that is a best move — that is, all possible previous moves (moves leading to the diagram) are bad, in the sense that alternative moves are available that will draw. Therefore the backing-up procedure by which the program has generated the database, is at an end for this particular sequence — it's the end for the program, but the beginning for the player. Naturally, these "no ancestors" positions arise at all move-depths.

Software study

● From front page

such as that envisaged by Codasyl's COSCL committee (CW, March 16).

The third study, of the need for new conversion tools, is to begin with a review of current tools, available or under development, and will go on to make proposals and recommendations for the development of new facilities.

All the studies are to be completed within one year and have been allocated budgets of 89,000 Accounting Units, 120,000 AU and 71,000 AU respectively. Accounting Units are currently valued for UK purposes at about one dollar.

The director of the Computing Services Association, Alan Benjamin, who welcomed the studies as focusing on important problems and future opportunities, said that at least six UK software houses intended to submit tenders.

The only company willing to confirm its position as a bidder was Software Sciences, which has joined forces with two European partners. Software Sciences has in the past developed its own system implementation language, Slan.

Systems Designers would neither confirm nor deny that it was preparing a tender, and both Logica and Scicon said that they would not be bidding.

Portability was one of the major project areas identified by the Commission nearly three years ago, as part of a comprehensive plan for the European computer industry (CW, October 16, 1975). A survey of Cobol portability and the need for standardisation is already under way and should be completed shortly (CW, November 24, 1977).

The Commission notes that in none of the areas does it want to conduct a limited survey of the existing state of the art. Rather it wants to achieve a "better understanding of the ways and means by which a working portability of programs may be obtained and of developments which could be envisaged in order to do so".

A relatively short period has been set for the preparation and evaluation of tenders, which are due to be returned early in September. A decision period of about four weeks will then follow, after which the successful contractors will be expected to start work immediately.

Considerable flexibility has been allowed to potential contractors, who may bid individually for any or all of the studies.

Pass laws machine

● From front page

No licence is required from the Department of Trade for export of general-purpose computers from the UK to South Africa. In compliance with the United Nations mandatory embargo on the sale of arms to South Africa, an export licence would be required for the sale of a military computer, but a general-purpose machine for the civil police would not fall into this category.

ICL declined to acknowledge the order, saying it did not do so without prior consent from the customer. It merely reiterated that it does business with any country with which trade is legal under UK law.

There is a growing movement in Black Africa, led by Nigeria, to cease trading with any company which does business in South Africa; however, ICL South Africa is one of the company's two or three largest and fastest-growing overseas subsidiaries, and has the biggest installed base of large-scale 2900s outside the UK.

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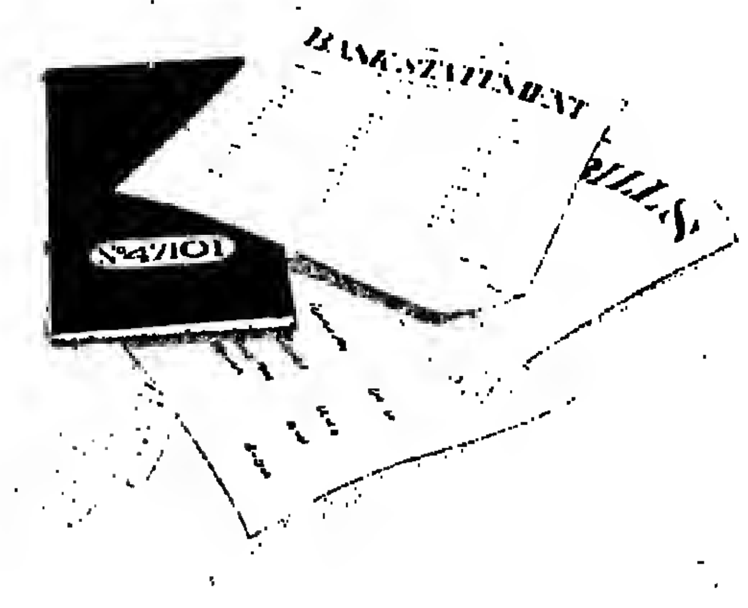

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For the future the Group's operation will continue to provide challenging opportunities for ambitious Analysts and Programmers. It's just the right time for you to develop your skills with positive goals to aim for, if you fit the jobs described below:

SYSTEMS ANALYSTS – to £5,700

This position will give you a significant degree of business involvement using all the latest techniques in hardware and software. If you have at least 12 months systems experience, extend your career with us where you will have full responsibility for initiation of systems and all stages to full implementation.

PROGRAMMERS – to £5,400

Your fluency in Cobol, coupled with intensive in-house education into Honeywell will open up a diverse range of applications incorporating Database (IDS) and communications (TDS). At least 12 months previous experience is required for these positions.

TECHNICAL SUPPORT PROGRAMMER – to £5,700

Your major function will be to install, maintain and monitor our software; it is essential, therefore, that you have proficiency in a low level language (preferably GMAP) and ideally experience of an advanced operating system.

Right from the start we'll offer you an attractive remuneration package, including re-location to this area on the fringe of the Yorkshire Dales abounding in low-cost property. Please send us a full c.v. staking your claim to an early interview to:

Mr. P.R. Bygate,
Personnel Manager
Associated Dairies Limited
Craven House, Kirkstall Road,
Leeds LS3 1JE.

Asda SUPERSTORES

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OPERATORS . . . DO YOU PREFER TO DO IT DURING THE DAY RATHER THAN AT NIGHT?

The SDI Support Centre is moving to a new computer suite situated in the New Kings Road, Fulham.

This move, combined with an internal promotion, has created the following vacancy:

SENIOR OPERATOR — Day Shift only c. £4,500

Responsibilities will include:

- ★ Supervision of operations staff
- ★ Training of junior operators
- ★ Computer time scheduling
- ★ Supervision of computer and computer room maintenance

Ideally, the successful applicant will have proven supervisory ability, with a minimum of two years' IBM operating experience, preferably using DOS or DOS/VS and/or GRASP (VS).

For more information ring John Broughton on 01-736 8184 or write to him at:
SDI
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SDI

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CENTRAL LONDON U.S. Bureau 1st Year Min. £5000

This rapidly expanding timesharing bureau is seeking sales trainees to augment a busy sales team in their City office. The Company market a range of powerful software products in the financial modelling, corporate planning and marketing analysis fields.

Successful applicants will receive an excellent training in both the Company's products and sales technique. Training will extend over the first six months with Trainees moving into an active role during the second half of the year. Sales Executives with the Company are currently earning salaries in excess of £10,000 per annum.

Applicants should have a minimum of 2 years' commercial experience, gained in either a D.P., Accountancy or Marketing organisation. Educational background and communication skills will be major contributory factors, together with the desire to join a fast growing American Company with turnover over $150 million.

Ref. W1/1008

18 MONTHS' COBOL?

On-Line Real-Time Projects

BUCKS **To £5250**

This busy engineering company is currently developing several on-line real-time applications on IBM hardware. Vacancies now exist for Programming staff with a minimum of 18 months' COBOL, gained on any hardware, to join a Project Team developing programs to run with IMS and DC/DB software.

The company offers an excellent training programme together with real opportunities of progression to Analyst/Programmer and Team Leading roles.

Terms and conditions of employment are outstanding and include relocation assistance and five weeks' holiday per year.

Ref. W2/1008

2 YEARS ANY COBOL PROGRAMMERS

SURREY **TOTAL TO £6500**

Our client is eager to recruit additional Programmers in order to release several projects awaiting development. Centred on large IBM mainframes operating under OS, the D.P. department is ready to expand its database systems to encompass the new applications.

Programmers will undergo an extensive training scheme covering languages, database techniques and teleprocessing.

Applicants should offer at least 2 years' experience (18 months with relevant degree) in COBOL on ANY MACHINE, or IBM ASSEMBLER

The Company's modern, air conditioned data centre is set in the attractive countryside of Surrey and offers successful candidates an excellent opportunity to advance their careers within a progressive environment. Generous relocation expenses are available and the total benefits package is financially very rewarding.

Ref. S2/1008

PROGRAMMERS

IBM HARDWARE — TRAINING GIVEN

CHELMSFORD AREA **To £6000**

We are seeking experienced Programmers for our client, whose modern offices are conveniently situated in the Chelmsford area of Essex.

The installation comprises IBM mainframes which support a large teleprocessing network. The company is currently expanding and developing this service and where necessary successful applicants will receive full training before joining project teams.

To qualify in the first instance for one of these positions you should have a minimum of one year's programming experience, Assembler or a high level language, gained on any manufacturer's hardware. You should be keen to work in a stimulating and progressive environment where you will be rewarded for effort.

Ref. E1/1008

24-hour answering service
Please telephone for a confidential discussion or write to:
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01-353 0981

SENIOR PROGRAMMER
£4773-£5073 p.a. F2A040/CW

PROGRAMMERS £3732-£4146 p.a. F2A060/CW

Bradford requires programmers for the Computer Section which comprises of some 100 staff providing a wide range of corporate computer services based on a 192K ICL 1904A on 3 shifts with approximately 50 terminals, and on 4 mini computer systems. A new Honeywell 66 - DPS 100 replacement is to be installed during 1979 together with an ICL 2904 for college use and an ICL 2903 at the City Court. All will have telecommunications facilities.

The initial duties are likely to be on conversion but development is normally carried out by mixed project teams. For the senior post suitable candidates will be given the opportunity to train as Systems Analysts later.

The Senior Programmer will possess considerable COBOL experience, and preferably have a knowledge of some of the following: GEORGE 3 or GCOS, teleprocessing or database software, modelling, graphics, FORTRAN, PLAN or BASIC. A degree or other professional qualification would be an advantage. The postholder may be required to be 'on call' and telephone rental will be payable.

For the posts of Programmer applicants should have at least 12 months experience of COBOL, and a minimum of 5 'O' levels, though a degree or other qualification will be an additional advantage.

The work location is Central Bradford. Overtime is payable and in certain instances assistance will be given with removal expenses. Starting salary is dependant upon experience etc. Existing holiday arrangements will be honoured.

The above salary figures are inclusive of supplement.

The above posts are open to both men and women.

Application forms are available from the Principal Staffing and Training Officer, Directorate of Finance, Britannia House, Hall Ings, Bradford BD1 1HX or telephone Bradford 29577 ext. 692 or 7704.

City of Bradford Metropolitan Council

County Treasurer's Department
Computer Division

SYSTEM SUPPORT PROGRAMMERS

(Posts C180 and C213) £4245 to £8073

(Readvertisement — previous applicants need not apply)

The successful applicants will join a team responsible for the operating system, development of systems support software, and assisting with investigations into a replacement for the present installation (ICL 1904S (256K) with extensive communications facilities).

It is expected that the applicants will have a relevant University Degree together with at least one year's post graduate experience in an ICL 1900 GEORGE 3 installation and have a working knowledge of COBOL, FORTRAN and PLAN.

Contributions towards removal and disturbance expenses will be payable in accordance with the Council's Scheme.

Requests for application forms stating post number to County Treasurer (Ref. RF6), Suffolk County Council, Milner House, Rope Walk, Ipswich. Closing date for completed application forms 31st August, 1978.

Suffolk County Council

F INTERNATIONAL LIMITED

SYSTEMS ANALYSTS PROGRAMMERS

Continuing our period of planned expansion we would be pleased to meet Systems Analysts and Programmers with a minimum of 4 years' experience interested in either part-time home based or full-time opportunities within one of the country's leading software houses.

Come and meet us for informal discussion on Wednesday, August 23rd, between 1915 and 2100 hours at the Hotel Leofric, Broadgate, COVENTRY or Holiday Inn, St. Nicholas Circle, LEICESTER.

If you are unable to come along then or are interested in opportunities in other parts of the country, please contact the Personnel Officer, F International Limited, The Bury, Church Street, Chesham, Buckinghamshire HP5 1LB (Tel: Chesham (02405) 4999) for detailed literature.

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West Bromwich

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As part of our expansion policy we are installing an I.C.L. 2960 in new office premises at West Bromwich in September this year, which will offer our Customers a batch and remote service.

In order to strengthen our Operations Team we require a person with at least six months' practical 2900 series experience, who is seeking further responsibilities.

The position will initially control, on a shift basis, a Shift Leader, two Operators, and a Data Controller. Development and Training will be encouraged to enable the job holder to enhance his responsibilities in other ancillary areas, e.g.: dump cracking, S.C.L.

In addition to a salary within the above range the usual terms and benefits of a large Company will apply. Please write in the first instance giving details of age, qualifications, and experience to:

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Computer Operations Manager
Safe Computing Ltd.
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Basic salary from £4,000+
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This is an opportunity for an additional Recruitment Consultant to join the Staffscene Organisation. Candidates should ideally have a background in commercial Programming or Analysis, although the main requirement is experience within a DP Consultancy Agency.

You will be based at our Fleet Street location, one of a network of three distinct offices — the others are in the City and West End — and will be responsible for maintaining the efficient and personal service that this company is famous for.

If successful, you will be joining an expanding company offering limitless potential and highly attainable income of £10,000 in your first year.

For more information and an informal interview, call our Managing Director, Martin Grayson, now.

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RPG II PROGRAMMERS £4,500-£5,750
A fantastic opportunity to join this world wide financial concern retaining IBM SYS 3/12, SYS 32. Exciting growth potential and CHEAP MORTGAGE

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Outstanding career prospects await Programmers with 1 yr + experience in London, Surrey, Herts and Middlesex. Opportunities include training in DATA BASE. Perks include CHEAP MORTGAGE

ICL COBOL PROGRAMMERS £4,200-£5,500
A sophisticated technology user needs to boost its Programming team. They have a large ICL 1900 installation and offer excellent career prospects and benefits

BAL & PL1 PROGRAMMERS £4,000-£7,200+
A prestige City institution offers challenging career prospects in a dynamic environment. Perks include flexi hours and a subsidised canteen

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If you're a Mini Programmer involved in Technical or Commercial applications, with experience of Mini Assembler, BASIC + RSTS or CORAL 66 then call for details

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[illegible]

ICL [illegible] OPERATOR — £3750
With a minimum of one year's GIII experience, you could be working for this nationally famous food retailer, based near Waterloo Station. A three shift system is worked. The job offers excellent prospects, plus a range of big company benefits including a staff restaurant plus extensive sports and social facilities

[illegible] SHIFT LEADER — c. £5000+
Based in North London, this job requires 18 months' plus experience on ICL under GIII. It's with a Banking organisation, and amongst perks offered are free meals, four weeks' holiday and a pension

ICL 1902T SHIFT LEADER — c. £4250+O/T
You'll be based in South London, and should have two years' experience of ICL under GIII. There's a three-shift system, and the Company offers outstanding prospects and more than generous perks

IBM 370/138 SHIFT LEADERS & OPERATORS — £4300-£5000 (under review)
This famous East London Company is looking for Shift Leaders/Senior Operators experience in DOS/VS and POWER. You'll be working a two-shift system (latest finish 11.30 p.m.) and perks offered include a staff restaurant and four weeks' annual holiday

TWO IBM 370/138/148 OPERATORS — to £4400
City based, you'll need around two years' experience under DOS/VS and GRASP for these senior positions. Benefits include a season ticket loan and LVs

JUNIOR OPERATOR — ICL 1902A — £3700
A salary review after only three months is offered by this North London Co. Six months is all the ICL experience you'll need. So, if you're looking for a job that offers outstanding prospects, a good salary and excellent benefits, call today

JUNIOR NCR CRITERION 8570 OPERATOR
If you have six months' Criterion experience — or more — you'll be ideal for this Surrey/South London based installation. Prospects are outstanding, and benefits include LVs, 4 weeks' holidays and a sizeable discount on furniture.

SENIOR PDP 11/35x3 OPERATOR — £4000+
Central London based, this job offers excellent prospect up to Programming for a Senior Operator with a knowledge of RSTS. Big company benefits include free life assurance, four weeks' hols., a pension scheme and a substantial staff restaurant

NCR OPS — CHANGE TO IBM! — c. £3000
This North London company, currently running an NCR Century, are soon changing to IBM. They're looking for Ops who would welcome the challenge of a switch in disciplines. Obviously, career prospects are more than promising — and company benefits aren't bad, either!

ANY MAINFRAME EXPERIENCE — CHANGE TO BURROUGHS — to £4000
If you have around two years' experience on any mainframe, this West End company is willing to retrain you. DAYS ONLY, you'll get a bonus, and one of the perks is CHEAP BOOZE!

HONEYWELL OS2000 OPERATORS — to £4000+
Junior or Senior, this City based job offers you a CHEAP MORTGAGE, cheap personal loans, more than generous LVs, season ticket loan and four weeks' hols. Whatever your level, career prospects are second to none

UNIVAC 1100 OPERATOR — £4400
Software knowledge is unimportant in this West London job, as long as you have around two years' Univac experience. You should be aged 20+, willing to work a 2/3 shift system and look forward to a job that offers the prospect of extensive overseas travel

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If you are an experienced DP professional attracted to this challenging environment [illegible]

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Our working conditions are excellent, with good Company relations.

Apply directly in writing, or by telephone for application form to:—

Personnel Department
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New Road, Durrington
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Tel: Worthing 68661

JAMAICA

The COLLEGE OF ARTS, SCIENCE & TECHNOLOGY

have an immediate vacancy for a

SENIOR or PRINCIPAL LECTURER in COMPUTER STUDIES

whose main duties will be to lecture to B.C.S. Parts I & II and to give advice on Systems and Programming to the Computer Centre.

A degree or professional qualification and at least 8 years' practical systems and programming experience; some lecturing or training experience preferred.

SALARY in range £5,040-£7,368 (married) or £3,706-£4,074 (single) tax-free for two years.

The salary includes supplement paid by the British Government to citizens of the U.K. £1200 marriage allowance p.a., 25% terminal gratuity on basic salary, holiday visit passages and education allowances for children, free passages, an appointment grant and interest-free car loan are payable in certain circumstances.

Appointment is on contract to the College for two years commencing as soon as possible.

Applicants should send their curriculum vitae to the Recruitment Unit, TETOC (Technical Education and Training Organisation for Overseas Countries), 36/37 Grosvenor Gardens, London SW1W 0BS, in the first instance and further details will then be despatched.

Programmers who want Systems Involvement

S.E. England — Start to £6K

To support further installations of our production control software systems, we require several men or women with good experience of:
RPG II on 2903 or System 3
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Knowledge of production control systems would be an obvious advantage. There are opportunities for those who wish to specialise in this field and for those who see a spell with a consultancy as a stepping stone to broader responsibilities.

Please write or telephone:
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COMPUTER WEEKLY

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Computer Personnel Consultants

PROGRAMMING CONSULTANTS

RPGII/ASSEMBLER EXPERTISE

LONDON/SURREY £5000-£7000 + +

Our client offers a genuine consultancy service mainly to first-time users who wish to establish a small data processing department to streamline accountancy procedures and introduce modern Stock-Control techniques.

Applicants should be conversant with RPGII or Assembler, gained on small computers (IBM SYSTEM 3 or 32; ICL 2903 or SYSTEM 10) and possess system design experience. A knowledge of financial systems and/or on-line techniques will be an advantage.

These positions offer a great degree of responsibility and all employees are encouraged to develop their careers as data processing financial consultants.

JUNIOR CONSULTANTS will join small project teams to gain experience installing total systems and solving clients' problems. They will receive formal training in communications and business procedures.

SENIOR CONSULTANTS will lead project teams and provide technical support to the sales force. They will be responsible for meeting targets and ensuring complete client satisfaction at all stages.

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Ref. S1/1008

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SUPPORT ANALYSTS — London City — c. £7K + car
Manufacturer opening new City branch need exp. Analysts. (David)

COBOL PROGRAMMERS — Waterloo Station Area — c. £5500
New development work for large Systems House (Bill)

SYSTEMS MANAGER — Middlesex — c. £7000
Development work, Manuf. Co. System 3 exp. (David)

PL/1 PROGRAMMERS — Central London — to £6000
New 378 Installation. Gain exp. in CICS & DL/1. (Bill)

COBOL PROGRAMMERS — North Surrey — c. £5000 + Mortgage
Retrain to IBM if necessary. (Bill)

SYSTEMS & PROGRAMMING MANAGER — West London — c. £7500 + Benefits
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SYSTEMS ANALYST — Maidenhead — c. £6000
Commercial Systems Exp. (David)

ANAL/PROGS & PROGS — Maidenhead — Highest Local Sals.
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COBOL PROGRAMMERS — Twickenham — to £8K
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Bill Taylor (Even. & Weekend 0990-24978)
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YOUR JOB IS VARIED AND EXCITING ... Kidding yourself? We're offering a wide variety of projects on IBM 370's (OS/DOS) and Honeywell 66/64/62's which could make your life a little livelier.

YOUR PROSPECTS ARE STUNNING ... but our rather unusual growth rate might just make your future a little brighter.

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DATA BASE ADMINISTRATOR

S. London/Surrey

to £8,500

Candidates might currently be data base administrators or those with significant data base design experience wishing to broaden their involvement. As this is a new post there will be considerable flexibility of operations. The successful applicant will be responsible for data base design and management as well as acting as a consultant to the department as a whole.

Our client is a major and well respected financial organisation already successfully utilising advanced IBM hardware/software. Currently major expansion plans, which include the creation of this post, are under way. Significant on-line and data base projects are to be implemented.

The position is to be a key part of a small, highly competent team responsible directly to the Technical Director. Applicants should have in-depth DBMS knowledge, be self-motivated, and have a professional and innovative outlook.

This is an opportunity for someone who previously has felt his ideas rather stifled to be in on the ground floor of a new development. Starting salary will be negotiable to £8,500, dependent on experience and benefits include four weeks' holiday, non-contributory pension, LVs and flexi-time.

To find out more about this position, telephone our CROYDON OFFICE quoting REF. CW30-BH, or write enclosing brief details of experience and expectations.

01-686 9693 (24 HOUR ANSAPHONE)
19 PARK STREET, CROYDON, CR9 1TN

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FAULKNER STREET, MANCHESTER
M1 4YD

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS — CAPP ASSOCIATES LONDON AND MANCHESTER — Computing Services Association

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The Board is embarking on an extensive development of their computer activities. Major developments in the field of Customer Service is planned, to include the extended use of the large existing remote terminal system.

The current twin ICL System 4 computers are to be replaced in mid 1979 by dual ICL 2960 computers as the first phase of enhancement of the installation.

The opportunity has arisen for trained computer staff, who are keen to be involved in these important developments, to join the Board, and applications are invited for the following range of posts:

SENIOR/ANALYST PROGRAMMERS

Ref. No. 286/78

Applicants must have in excess of two years' COBOL programming experience together with a working knowledge of systems design. Training will be given to develop systems design experience as required.

SENIOR SOFTWARE PROGRAMMERS

Ref. No. 287/78

Applicants must have in excess of two years' COBOL programming experience together with practical knowledge of an assembler based language. Experience in communication system programming will be an advantage.

Salary for posts Ref. No. 286/78 and Ref. No. 287/78 — £4,660 per annum (inclusive of productivity payment) rising to £6,130 per annum (by annual increments).

ANALYST/PROGRAMMERS

Ref. No. 288/78

Applicants should have two years' COBOL programming experience and be interested in developing the element of systems design experience within the post. Consideration will be given to applicants who have less than two years' COBOL experience but have had systems training.

SOFTWARE PROGRAMMERS

Ref. No. 289/78

Applicants should have two years' COBOL programming experience and an interest in software and communication program development.

Salary for posts Ref. No. 288/78 and Ref. No. 289/78 — £4,120 per annum (including productivity payment) rising to £5,470 per annum (by annual increments).

NEEB

Applications, stating age, qualifications and experience and quoting the appropriate reference number, should reach the Personnel Officer, NEEB, Carliol House, Newcastle-upon-Tyne NE99 1SE, by 19th August, 1978.

PDP-11 COMPILER

We require assembly language programmers to work on PDP-11 systems software in house developing machine.

JHDP LTD
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GREATER MANCHESTER COUNCIL

COUNTY ENGINEER'S DEPARTMENT

The technical sections within the GMC are currently using the inter-active computer facilities provided by the recently installed 384K Byte Prime 400 Computer. The computer has 2x80 megabyte discs and two tape drives and is being linked to a graphics unit.

Additional staff are now required to develop new computer systems in the fields of civil engineering, accident investigation, highway maintenance and refuse disposal.

SOFTWARE PROGRAMMER

£3933/£5748 + £312 p.a. supplement

Required to provide software support for the Prime 400 Computer. Duties will include installing and writing new system software and assisting applications programmers. Experience of mini-computers is desirable, although this could provide an opportunity for applications programmers who wish to transfer to systems software.

SYSTEMS ANALYST/PROGRAMMERS

(TWO POSTS) — £3933/£5748 + £312 p.a. supplement

To assist in the development of a wide range of technical systems and management information systems for the technical sections of the GMC. Ideally, applicants should have a Degree and several years of programming and several years of programming experience, preferably using Fortran.

Commencing salary will depend on age and experience, although applicants with limited computing experience will be considered but at a lower starting salary.

Conditions of Service include removal, legal, etc., expenses up to £750 and lodging allowance.

Applications by letter giving full details of age, experience, qualifications, and salary and the names and addresses of two referees to the County Personnel Officer, County Hall, Piccadilly Gardens, Manchester M60 3HP by 25th August.

Application Systems Analyst Programmer PARIS

DATA GENERAL is a US based minicomputer company with over 10000 employees worldwide, a turnover in excess of $ 250 millions, a net profit more than 11% and New York Stock Exchange listed. Our growth rate is close to 50% annually.

THE JOB:
- Study and evaluate existing application systems developed by the corporation
- Modify existing systems and/or develop new programs
- Deliver and install application systems in our European subsidiaries
- Provide technical support on delivered systems
- Train users and D.P. operations team

REQUIREMENTS:
- A University or College degree, preferably in electronics, computer science
- Two years experience as an analyst programmer on application systems
- A real practice of Cobol and Fortran
- Willing to travel in Europe
- Age under 35

The job is based in PARIS, in our European Headquarters. Interested?

Send a detailed CV to our Employment Manager Jan Cederlund, 61, rue de Courcelles 75008 Paris.

If you need more information call Jan Cederlund in Paris, tel. (01) 766.01.78.

with

Data General

JBA

Junior Consultants

Berks/USA/Europe — Start c. £7,000 + BUPA

Opportunities have arisen in the European Systems team of this major American company for Analysts or Analyst/Programmers to join as Project Consultants. They will provide support and advice on commercial projects of all kinds to installations throughout the UK and Europe, and applicants should therefore have a good grounding in commercial applications, preferably with a strong IBM bias.

These vacancies have occurred through internal promotions to more senior levels indicating that career prospects are definitely good for able candidates.

An ideal opportunity to gain experience of Project Management at Consultancy level. Travel to the USA and Europe, supported by generous tax-free allowances, will play a major part of the job — Contact: Andy Wright

Analyst/Programmers

London — up to £6,000

Our client, an international computer services organisation has opportunities for staff to join project teams developing commercial systems.

Applicants should have a minimum of two years of programming in COBOL, PL/1 or RPG2 in a commercial applications environment and have been involved in the design of at least one system. Knowledge of terminal and real-time working would be an advantage.

Career prospects to project leader are excellent.

Salary according to experience. Large company benefits with chance to travel. — Contact: Mike Creamer

HOLLAND Programming Team

up to £12,500

We have been retained to recruit a team of IBM370 OS/VS1 experienced programmers with a very sound COBOL background and complete familiarity with JCL. The group will comprise a team leader, three junior analysts or Senior programmers, and several junior programmers (with *at least* 18 months experience).

The project applications area will include factory systems, material management, stock control, purchasing and work in progress. Ideal commencement date will be early October and interviews will be held during August in the UK and Holland.

Lovely opportunity to experience living and working in Holland whilst earning good salaries. — Contact: Mike Creamer

Systems Analysts

London W1 — £5,500–£7,500

A major British engineering and construction company has retained JBA to recruit Systems Analysts to strengthen their financial systems team.

All applicants must have worked on financial systems, and for the Senior positions, a minimum of four years relevant experience is expected. The less senior vacancies would commence at salary levels of c. £6,000; Analyst/Programmers looking for a move into full systems analysis should have a minimum of three years D.P. experience.

Good salaries and working conditions, plus the attraction of being part of a dynamic environment — Contact: Andy Wright

Process Control

Bracknell — up to £6,000

A small development group has been established in Bracknell by an international engineering organisation to continue their expansion of the industrial systems market. They have immediate opportunities for mini-computer programmers and specialists to work at all levels on these projects.

Applicants must have at least two years experience in industrial or process control applications using mini-computers. A sound background of FORTRAN, CORAL, RTL2 or Assembler is essential.

Excellent salaries, relocation expenses and the opportunity for commissioning work in various parts of the world. — Contact: Andy Wright

HOLLAND CAD/CAM Consultant

Salary & terms negotiable

This senior position will suit a specialist in computer aided design/management wishing to apply his or her experience and knowledge in a consultancy role. The particular skills required are in the areas of interactive graphics applications, numerical control system design, part production systems and design analysis. Dealing with potential customers and assisting the sales and support teams will be the essential part of the job, as well as advising the programming and design teams.

The successful candidate will have a proven track record in CAD/CAM type development and sales, be a highly personable and presentable individual with a willingness to travel and deal with people at all levels. European language ability an obvious bonus.

Attractive senior staff position offering tremendous scope for creativity, job satisfaction and career development. — Contact: Mike Creamer

For further information on any of the above vacancies please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

BORG WARNER

BORG-WARNER LIMITED

TRANSMISSION DIVISION

BUSINESS SYSTEMS ANALYST

Borg-Warner Limited, Europe's leading independent manufacturer of automatic transmissions, have a vacancy for a Business Systems Analyst within their Finance Department, located at Letchworth in the pleasant countryside of North Hertfordshire.

This position provides a challenging opportunity for an experienced Systems Analyst to introduce new ideas and techniques within this key area of our business. The Business Systems Analyst will report directly to the General Accounting Controller, and his/her duties will include the design, implementation and development of new accounting systems using an ICL Computer.

Candidates should preferably be qualified to Degree or equivalent level of education and have several years' experience within this field.

The Company offers a competitive salary and excellent benefits, including 21 days' annual holiday, Pension and Sickness benefit schemes, Personal Accident Insurance, etc.

Please write or telephone for an application form to:

John F. Meachen, Personnel Manager
Borg-Warner Limited, Transmission Division
Jubilee Road, Letchworth, Herts. SG6 1NH
Tel. Letchworth 2333

SPAN COMPUTER PERSONNEL

OPERATIONS TROUBLESHOOTER

A large organisation based in **Central London** requires a troubleshooter for their IBM 370 configuration. Your background should be predominantly OS VS1 with MVT, it is essential that you have a thorough knowledge of OS JCL.

Salary to £5,500 — Ref. GD 1459

SHIFT SUPERVISOR

An ICL 1900 background, utilising Geo 2+ is a must for this position. You will have 3-4 yrs. experience in all, with some spent at supervisory level. Additionally you will be able to train and control other staff. The company is based in HAMPSHIRE and will pay relocation expenses where appropriate.

Salary to £5,400 — Ref. GD 1441

OPERATIONS PERSONNEL

I CAN FIND YOU A BETTER JOB THAN YOU CAN FIND YOURSELF

I specialise in operations posts at all levels, whether you have just begun in DP with 6 months' experience or are looking for a more senior position or management opportunities — I can help.

My current job file is full of exciting vacancies for operators with various hardware skills.

Allow me to try on your behalf to further your own career.

Telephone me, Glen Donnelly, immediately.

2 HOBART PLACE LONDON SW1 01-235 3215

PAISLEY COLLEGE
DEPARTMENT OF MATHEMATICS AND COMPUTING

ASSOCIATE HEAD OF DEPARTMENT IN COMPUTING

Applicants should have substantial experience in relevant fields of Computing or Computer Science. The appointment is at professorial level and the successful applicant will have corresponding academic and administrative responsibilities.

The responsibilities will include leadership of the degree and honours degrees in Computing and the development of future courses in this field; the development of research work and of consultancy with industry and commerce.

LECTURER IN COMPUTER SCIENCE

Applicants should possess a broad general background in the subjects of Computer Science and preferably have specialised knowledge or research interests in the areas:

Communications (Networks and Data Transmission)
Real-Time

Applicants should preferably have some significant industrial experience.

Salary: Associate Head £10,011 p.a.
Salary: Lectureship — will be within the range £4056–£7596 p.a.

Application forms and further particulars are available from Establishment Section, Paisley College of Technology, High Street, Paisley, PA1 2BE (telephone 041-887 1241 ext. 234). Please quote Ref. CW15/1. Closing date 4th September, 1978.

THE OPEN UNIVERSITY
STUDENT COMPUTING SERVICE

SYSTEMS PROGRAMMER

Applications are invited for the post of Systems Programmer at the University's headquarters in Milton Keynes. The Computing Service offers a timesharing service on Hewlett Packard 2000 and DEC-20 systems. Each of our three DEC-20 systems have a 2040 processor with 192K-36 bit words main store plus 2 x 100 mbyte disc drives and a tape drive.

The systems programmer will assist in the development and maintenance of the systems software on these machines. Whilst relevant systems experience is desirable applications from recently qualified computer science graduates will be considered.

Salary on the scale: £3,680 - £6,178.

Application forms and further particulars are available from: **The Recruitment Office (JD3613/3), The Open University, P.O. Box 75, Walton Hall, Milton Keynes MK7 6AL, or by telephone from Milton Keynes 63404.** There is a 24-hour answering service on 63868.

Closing date for applications. 25th August, 1978.

Computing – Apply Your Skills to Air Safety Research

The Royal Air Force Institute of Aviation Medicine, at Farnborough, is responsible for research into the human factors which determine the efficiency and safety of all who fly. Its work is of vital importance both to the RAF and to civil aviation. The computing section provides full support to the experimental programmes.

Systems Software Analyst

The successful candidate will be responsible for the development and maintenance of the systems software for a medium size multi function complex. The central system is connected to the high speed hybrid subsystem and to other general and special purpose devices operating over high speed private lines. Candidates may occasionally be involved in applications programming in FORTRAN and should have some experience of programming in a high level language. Suitable operating system training can be provided by the manufacturers.

Computer Programmer

The programmer appointed will join a team providing the Institute with high level programming support for a variety of problems associated with physiological and psychological research. Programs are usually written in FORTRAN. Training in more advanced techniques can be given.
Candidates should have a Degree/HND/HNC in an appropriate discipline and should be conversant with operating system principles.
Appointment as Higher Scientific Officer (£4100–£5450) or Scientific Officer (£2840–£4410) according to qualifications and experience. Promotion prospects. Non-contributory pension scheme.
For further details and application form (to be returned by 25 August 1978) write to Ministry of Defence, CM(S)rb3, Room 310, Savoy Hill House, Savoy Hill, Strand, London, WC2R 0BX.
Please quote ref: SA/26/EM.

Science Group
CIVIL SERVICE

GAMMA

Computer Engineers

We are a leading company in the Computer field and, due to expansion, require Computer Engineers.
These positions will be based in Nottingham although travel within the U.K. and overseas may be involved.
Salary will be negotiable up to £6,500 per annum and the company offers many benefits including BUPA membership and a company car.
Applicants, male or female, should preferably have DEC PDP11 experience but this is not essential as full training will be given.

GAMMA ASSOCIATES LIMITED
Compass House
The Ropewalk, Nottingham
Telephone: Nottingham 49555

Apply to Rick Goold
Engineering Services Manager

LONDON BOROUGH OF HARINGEY

COMPREHENSIVE HOUSING SERVICE

COMPUTER OFFICER

BO2 £6012-£6345 plus casual user car allowance

Haringey's Comprehensive Housing Service is looking for a person who has computer systems development experience and who would now like to put this experience to use, in an effort to improve the operating efficiency and information systems of the Housing Service for the benefit of the public.

An enthusiastic, self-motivated man or woman is therefore required who can ensure that new or existing computer based systems are fully developed and utilised.

This is a new post which is based within the Housing Service to ensure that benefits derived are service orientated. The post holder will also be required to liaise closely with an existing Borough development team, whose main role is to develop the use of a joint consortium on line, computer network LOCA which uses an I.B.M. 370/168. The successful applicant could work on any Housing Service function which requires computer system support (e.g. property records, rents, waiting list etc.), and should have the ability to liaise closely with other officers to understand and identify areas where computer developments are needed.

Application form and job description from Chief Administrative Officer, 13/27 Station Road, Wood Green N 22. Applications returnable by August 25th, 1978.

Computer Operators
We talk your language.

George 3 or OS/VS1 – Salary range £4,000-£4,400 p.a. with valuable extra benefits.

When it comes to job satisfaction, it's worth talking to London Transport, the world's largest urban transport system.
At our rapidly expanding Data Processing Department in Central London, we're looking for more experienced staff with at least an 18-month background in George 3 or OS/VS1 operation.

As well as a salary in the range of £4,000-£4,400 p.a., we can also offer other benefits:
* FREE TRAVEL on London Transport services at all times.
* Good holidays.
* Subsidised staff restaurant.
* Pension Scheme
* Excellent sports facilities

You will also be given excellent training with good promotional prospects.
The installation currently comprises 2 ICL 1904s, 2 ICL 2904s, IBM 370/148 and IBM Series 1 computers, handling Batch Processing, Transaction Processing, Interactive Processing and On-Line Enquiry systems.
So if you have the experience and ability we're looking for, telephone the Senior Operations Controller now, on 01-837 9144, or write to The Staff Appointments and Development Officer, 55 Broadway, London SW1H 0BD, quoting reference 815/C.

LONDON TRANSPORT

COBOL PROGRAMMER

DURAPIPE are One of the market leaders in the manufacture of Thurmo Plastic Pressure Pipework Systems for industrial applications.
We are currently seeking an experienced Programmer to join our small, but expanding D.P. installation.
Applications are invited from Cobol Programmers with a minimum of 2 years commercial experience preferably with a knowledge of RPG II and on-line programming.
The successful applicant will be responsible for maintenance of all existing systems and assist with development. Must have a proven ability to work on his or her own initiative and show a keen interest in the efficient running of our Honeywell 62-40 computer.

Apply in writing to Mr R. R. CATMUR
Company Secretary
DURAPIPE LTD.
Norton Cane,
Cannock WS11 3NS

UNIVERSITY OF NOTTINGHAM
SYSTEMS ANALYST SENIOR PROGRAMMER

The University of Nottingham invites applications from suitably qualified and experienced candidates to fill the vacancies that have arisen within its University's Administrative Data Processing Unit, at present based on an ICL 1901A.

SYSTEMS ANALYST
The person appointed to the post will report directly to the Data Processing Officer within the Unit, and will have the responsibility for the maintenance of the existing systems and documentation, and the design and implementation of future projects. Experience with PLAN and/or COBOL languages and previous supervisory experience will be an advantage. The successful candidate will normally have had at least three years' experience of Systems Analysis in a commercial environment.
The starting salary will be within the range £3,109-£6,178 or £5,951-£7,308 and will be dependent upon qualifications and experience. Ref 619.

SENIOR PROGRAMMER
A minimum of three years' programming experience with PLAN and/or COBOL is required, together with the ability to lead a small team of programming staff on a wide variety of projects mostly of a commercial nature. He or she will have the opportunity of contributing in the development and design of the University's computerised administrative systems.
The starting salary will be within the range £3,109-£5,282 and will be dependent upon qualifications and experience.
Ref. 620.

Further details and forms of application, returnable not later than 31st August, 1978, from the Staff Appointments Officer, University of Nottingham, University Park, Nottingham NG7 2RD.

METROPOLITAN BOROUGH OF TRAFFORD
BOROUGH TREASURER'S DEPARTMENT

ANALYST PROGRAMMER

AP5-SO1 (£4,461-£5,256, plus £312 supplement)

Applications are invited from experienced computer programmers. Applicants should be familiar with Cobol and preferably with IBM equipment. The successful applicant will undertake both systems and programming work and will control a small programming team.

SYSTEMS PROGRAMMER

AP5-SO1 (£4,461-£5,256 plus £312 supplement)

Applications are invited from experienced programmers with an interest in systems programming. Experience of Cobol, CICS/VS, would be advantageous. The duties will include the generation and maintenance of the above product, performance tuning and the upkeep of other software, including the database system RAMIS II. The person appointed will work closely with the Operation Manager and systems and programming staff to ensure that the software gives the maximum performance.
The Council operates an IBM 370/135 under DOS/VS. A variety of financial and non-financial applications are processed currently and a new database system and extension of tele-processing is planned.
Application forms and further information from: The Borough Treasurer, P.O. Box 10, Warbrick House, 35/37 Washway Road, Sale, Manchester M33 1AL. (Tel. 061-969 6161, ext. 242). Closing date 28th August.

JUNIOR PROGRAMMERS

£3500 to £4750

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ALL AREAS
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LK Tool Company Limited
Leaders in Measuring Machine Technology
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COMPETENT MINI COMPUTER PROGRAMMERS

to join an expanding team working on varied high technology projects including N.A.S.A. Space Shuttle Programme.
Applicants should be experienced in Fortran, with good mathematical background and preferably engineering experience.
Please contact:
Roger Gilheany
LK TOOL COMPANY LIMITED
East Midlands Airport
Castle Donington, Derby
Telephone: Derby 811349

AMERICAN EXPRESS INTERNATIONAL BANKING GROUP

We are in the process of expanding our computerisation programme in the U.K. and now seek to fill two key positions to strengthen the mechanisation project team. Suitably qualified applicants are invited to apply for the following positions:

SYSTEMS ANALYST

The ideal candidate will have a minimum of 2-3 years' experience of systems analysis and design. This must include the implementation of at least one significant computer system. While programming experience would be an advantage, an O&M background, preferably in banking, is essential. The position will report directly to the Systems Manager and should afford considerable variety from one project to another. The successful candidate will have ample opportunity to progress towards becoming an all-round system designer of high quality.

COMPUTER PROGRAMMER

The ideal candidate will have at least 2-3 years' programming experience. Implementation experience must have been gained in a user environment on such equipment as IBM System 3, DEC PI1, etc. Major duties include new program development and live system support. The successful candidate will be required to demonstrate a high level of proficiency in the diagnosis and amendment of specified sets or suites of application programs and related software facilities in breakdown situations.

Both positions carry excellent salaries, and fringe benefits are in line with those normally associated with the International Banking sector.
Applicants should apply, in writing, to:
Mr. A. J. Reynolds, Deputy Personnel Manager
U.K. Region, 070 120 Moorgate, London EC2P 2JY

Wrangler

SYSTEMS ANALYST/PROGRAMMER

Wrangler, one of the world's leading manufacturers of leisure wear, want to offer an interesting job to an enthusiastic professional who has at least 1-2 years' systems and programming experience in a commercial environment. You must have a knowledge of Cobol or RPG and any experience of on-line systems could be a possible advantage.

You will join a small EDP team at our Head Office and Distribution Centre in Calverton and have the opportunity to become very involved in the activities of the site. The Company has an IBM System 3 and knowledge of this hardware would be useful.
Men or women interested in this position should telephone or write for an application form to

Mr. Alan J. Gabbitt, Personnel Manager
BLUE BELL APPAREL LIMITED
Calverton, Nottingham

MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

FORTRAN
FOR ADAPTABILITY

The arts give the world its pleasures, and science keeps the adrenalin flowing.
But whether you are into SCIENTIFIC or COMMERCIAL applications your FORTRAN experience is required. Extra languages also help.
Good Analysts and Programmers can choose their own location.

NORTHANTS to £7½K
Fortran & Assembler: minis & micros for development work & implementation

SOUTH MIDDLESEX to £5K
(Mini). Fortran O.R. Programmer

LONDON — WEST END to £7K
Analyst/Programmer for vital environment

BUCKS to £5K
(ICL). Engineering background useful

LOUGHBOROUGH, POOLE, SURREY £Neg.
Mini or Mainframe

Contact Derek Pearson — action TODAY pays dividends TOMORROW

RPG II PEOPLE
SUCCEED!

No longer is RPG a playtime language for first time users.
No longer need you be confined to System 3.
Opportunities are here for ANALYSTS and PROGRAMMERS on a wide range of machines to use that RPG expertise. Software House, Manufacturer, small business or large business — you tell me and see it all happen.

BIRMINGHAM, LEEDS to £6K
Wide ranging developments including Comms.

SURREY to £6½K
Programmer Analysts. IBM useful

SUNBURY-ON-THAMES to £5K
General commercial

HAMPSHIRE to £9K
All levels — insurance very useful

HERTS, BUCKS, ESSEX to £5½K
Varied disciplines

Contact Derek Pearson — TODAY — for interview TOMORROW

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611

MANAGEMENT & EXECUTIVE SELECTION

AUSTRALIA
SYSTEMS ANALYST

We are the service company for the Australian banks' national credit card scheme — Bankcard.
Our Systems Manager is visiting Britain during the second half of September. He would be interested to meet Systems Analysts who are considering emigrating to Australia. (Our offices are in the Sydney area.)
If you have spent more than 5 years in EDP with some proven Systems Analysis experience with batch applications, please airmail a résumé to reach me by the end of August.
We operate twin IBM/370 equipment in both batch and real-time modes. Network applications are front-ended through PDP minis.
We shall negotiate attractive salaries and benefits for the right applicants.
Please send résumés to

Allan Smith, Senior Systems Analyst
CHARGE CARD SERVICES LIMITED
P.O. Box 73
Auburn, N.S.W. 2144, Australia

CONTRACT OPERATIONS STAFF

D.P. Support Services now require experienced Data Controllers, Operators, and Senior Operators for operations support, to assist us in fulfilling various user requirements on both short and long term contracts.

All types of machinery and operating systems are involved, as are excellent rates of pay and conditions for competent operations staff, willing to use their experience and ability to the full.

Why not contact me to discuss the range of opportunities available?

Telephone in absolute confidence
Steve Gregory.

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KENT HOUSE, 87 REGENT STREET, LONDON W1R 7HF
TEL: 01-437 2062/3/4 (24-HOUR ANSAPHONE)

CITY TREASURER'S DEPARTMENT

The City Council have an IBM 370/138 on order and are planning a considerable expansion of both financial and non-financial services provided for departments. DL/I and CICS/VS will be used under DOS/VS.

Database Administrator
Salary scale £6,342-£7,044
Must have a wide in-depth knowledge of computer systems and experience of project design for applications using a DBMS.

Systems Analyst/Programmer (3)
Salary scale £5,232-£6,060
Must have participated in the design of at least one major system. Experience of CICS/VS or DL/I will be an advantage. These are the second tier level posts in established project teams.

Programmer (2)
Salary scale up to £5,073
Must have at least two years' experience preferably BAL or PL/I. A knowledge of CICS/VS or DL/I will be an advantage. Will join established project teams.

Senior Computer Operator
Salary scale £3,694-£4,118
(includes 14% shift allowance)
Two shift system in operation. Must have previous operating experience and a knowledge of DOS/VS will be preferred.
The newly constructed Civic Offices include a staff restaurant.
Flexible working hours.
Removal and resettlement expenses up to £500 payable in appropriate cases.

Application forms are available from the City Treasurer, Civic Offices, Guildhall Square, Portsmouth PO1 2AR or telephone Cath O'Neill on 0705 834348.
Closing date 7 September 1978

city of PORTSMOUTH

ABERDEEN
ROBERT GORDON'S INSTITUTE OF TECHNOLOGY

SCHOOL OF ELECTRONIC AND ELECTRICAL ENGINEERING

RESEARCH ASSISTANT

A Research Assistant is required to join an SRC supported Research Project concerned with the application of digital stochastic computing techniques in on-line control and simulation. Applicants should be honours graduates in Mathematics and Statistics or Computer Science or Electrical Engineering.
Three year fixed term contract.
Salary range £4,056, £4,311, £4,578 per annum.
Application forms are available from and should be returned as soon as possible to the
Chief Administrative Officer
Robert Gordon's Institute of Technology
Schoolhill
ABERDEEN
AB9 1FR

UNIVERSITY OF NEWCASTLE UPON TYNE
NORTHUMBRIAN UNIVERSITIES MULTIPLE ACCESS COMPUTER

SYSTEMS PROGRAMMER/PROGRAMMING ADVISER

Applications are invited from graduates to join a team of programmers working with IBM 370/168 and 360/67 computers. Development of both standard IBM operating systems and the Michigan Terminal System is being undertaken. Opportunities exist to work on the internals of these systems or to implement and advise on applications packages. Applicants should have a good knowledge of IBM systems and an understanding of the needs of a community of research workers.

The appointment will be made on one of the following scales according to age, qualifications and experience. Range 1A £3,660-£6,170 or Range II £5,730-£7,308 per annum. Membership of the appropriate University superannuation scheme will be required.

Further particulars may be obtained from the Registrar, The University, 6 Kensington Terrace, Newcastle upon Tyne, NE1 7RU, with whom applications (3 copies) together with the names and addresses of three referees, should be lodged not later than 28th August, 1978. Please quote reference CW.

SUN LIFE OF CANADA
COBOL PROGRAMMER

SALARY: Up to £6,000 p.a.

We are looking for a programmer with a minimum of eighteen months' COBOL experience. IBM 360-370 background is an advantage.
The successful applicant would participate in project work and have the opportunity to be trained in Analysis. We offer generous fringe benefits including a subsidised staff mortgage scheme, free lunches and flexible hours.
If you're interested please phone me on 930 5400 ext. 223, or write to me at the following address:

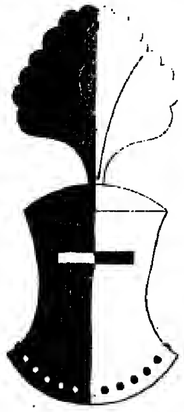
Mrs. S. Ives
Personnel Administration Dept.
SUN LIFE OF CANADA
2-4 Cockspur Street, London, SW1

Computing Services Association

CONTRACT MIDLANDS & N. ENGLAND

PROGRAMMER IBM FORTRAN	NORTH & MIDLANDS
PROGRAMMER IBM COBOL DL/I	MIDLANDS
SENIOR PROGRAMMER IBM CICS ASSEMBLER	NORTH WEST & MIDLANDS
SYSTEMS ANALYST IMS DB/DC	NORTH WEST & MIDLANDS
DATABASE DESIGNERS ENGINEERING	NORTH WEST
SYSTEMS ANALYSTS FINANCIAL	SCOTLAND
PROGRAMMER IBM PL/I CICS	MIDLANDS
PROGRAMMER HONEYWELL 66 IDS/TDS COBOL	NORTH WEST & MIDLANDS
PROGRAMMER IBM OS COBOL	NORTH & MIDLANDS
PROGRAMMER ICL 2960/2970 VMEB/K	NORTH & MIDLANDS
PROGRAMMER UNIVAC 1108 COBOL	NORTH WEST & MIDLANDS
PROGRAMMER ICL PLAN COBOL	NORTH & MIDLANDS

FOR DETAILS OF THESE AND OTHER CONTRACTS, PLEASE CONTACT MR. PERRY BUTLER, 143-144 ROYAL EXCHANGE BUILDINGS, CROSS ST., MANCHESTER M2. TELEPHONE NO. 061-833 9341/3. MIDLANDS 021-236 1794 Extension 223



KNIGHT PROGRAMMING SUPPORT LIMITED

143/144 ROYAL EXCHANGE, MANCHESTER M2

OFFICES AMSTERDAM, PARIS, BRUSSELS, LONDON, BIRMINGHAM

PENNINE DIVISION

CHIEF TECHNICAL ASSISTANT

(SYSTEMS)

Salary: £4,821-£6,181 (+ £312 pa supplement)

Based at Middleton, Lancs., you will be responsible to the assistant divisional finance officer (technical) for supervising the day-to-day operation of the data processing section of the division.

You will liaise with head office computer services staff on the implementation and development of financial and non-financial systems.

You should have appropriate educational qualifications and either a programming, systems or computer operations background.

Application forms and further details from: The Personnel Officer, North West Water, Pennine Division, London House, Oldham Road, Middleton, Manchester M24 1BD. Closing date for applications: 28th August, 1978.

The above post is open to men and women.

North West Water

MYRIAD

WHAT WILL YOU ACHIEVE BY CHRISTMAS?

SENIOR SYSTEMS ANALYST

North West London — **c £6500**

Our client is a fast growing company with multiple retail outlets and a centralised warehousing complex. The extensive use of computerised systems has enabled growth to take place in a controlled and planned manner.

A vacancy now exists for a Senior Analyst with two or more years' experience in a stock control environment who would welcome the responsibility of installing a high street retail stock replenishment system, the first phase of which should be implemented by Christmas.

The system will encompass:—

* OMR DATA CAPTURE
* DATA TRANSMISSION
* INTELLIGENT TERMINALS
* LARGE MAINFRAME/MINI INTERFACE

Applicants should have experience of successful project implementation and will join an installation where hard work and endeavour are recognised and rewarded. The company also offer a contributory pension scheme, luncheon vouchers and staff discount scheme.

Ref. N2/1008

MYRIAD APPOINTMENTS LIMITED Computer Personnel Consultants
Telephone or write to:- 30 Fleet Street London EC4Y 1AA 01-353 0981 (24 hrs)

KENT COUNTY COUNCIL

HIGHWAYS AND TRANSPORTATION DEPARTMENT

Technical Information and Computing Section

Section Engineer

£6060-£6702

Deputy Section Engineer

£4773-£6060

We are seeking experienced staff to manage a small section providing comprehensive advice, facilities and training to the technical branches of the Department. Applicants, male or female, must have wide experience of the application of computing techniques to road and bridge design, preferably including GEORGE III, FORTRAN, 8IPS 3, MDSS and finite element analysis.

The section has two programmers, a junior programmer and a terminal operator. Wide use is made of the County's ICL 1904S and computer bureaux through a range of terminals including a RBT, Tektronix and teletypes.

Further details and application forms returnable by 25 August, from the County Surveyor, Kent, House, Lower Stone Street, Maidstone, 'phone John Hanney on Maidstone (0622) 671411 ext. 3756. Please quote ref. P.8468/CW.

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Top ranking salaries + Tax-Free gratuity

If you have a good computer background with experience – preferably within an IBM environment using PL/1 – we'd like to tell you about the Technical and Commercial Systems we're developing in Zambia with IBM 370/158 Computers . . . the prospects there . . . the life for you and your family . . . the wonderful climate . . . and all the other things like low-cost accommodation, children's schooling, holidays and additional benefits.

For further details send us your name and address, quoting reference CW747, to:

The Manager, Zamble Appointments Division, Zimco House, 120-139 Finsbury Pavement, London EC2A 1NA.

RCM NCCM

CONTRACTS

London & Home Counties

BURROUGHS 6700

Programmer with a minimum of 3 years' B6700/COBOL experience to work on various projects for 3 to 6 months.

HONEYWELL 66/20

We require an experienced HONEYWELL LEVEL 66 programmer with COBOL & GCOS experience for a 2-month contract in Central London.

PHILIPS 410

Experienced P410/COBOL/DOS programmer required for 3-month contract in Central London.

ICL 2904

Programmer with ICL 2904/MTS experience required for 6-month contract.

Holland

SYSTEMS PROGRAMMER

With previous experience in a supervisory capacity to work in Amsterdam for a minimum of 1 year.

HONEYWELL 66/20

Programmer with a minimum of 2 years' HONEYWELL LEVEL 66/ASSEMBLER/G MAP experience, 3-month contract in Amsterdam.

PL/1 & RPGII

IBM 370 programmer with ASSEMBLER PL/1 & RPGII experience for a 6-month contract in Amsterdam.

For further details please contact Bridget Kotchie.

RENDECK LIMITED
100 New Bond Street
London W1Y 9LF
Tel: 01-629 8438

Rendeck

MANAGER

COMPUTER SERVICES

Post Number FS/83

£7418-£8183

Applications are invited from persons who have considerable experience in the use of computers, particularly IBM, and have experience in all aspects of data processing. The person appointed will be responsible for the management of the computer division of the City Treasury, and will be chief adviser on the use of computers to meet the City Council's information needs.

Southampton is ideally situated close to the South Coast resorts and the New Forest; it has impressive sporting and leisure facilities, and a fine shopping centre.

Employment benefits include:—

- Pleasant working conditions
- Flexible working hours
- Subsidised canteen
- Staff social club

Consideration will be given to the provision of housing accommodation in certain circumstances. Up to £500 towards removal and resettlement expenses plus a temporary lodging allowance of £10 per week may be available.

Application forms and a job description available from the City Treasurer, Civic Centre, Southampton SO9 4XD. Telephone Southampton 23885, ext. 616.

Closing date. 30th August.

Southampton City

SOUTHAMPTON

Senior Systems Analyst

Up to £10,336 (married) £7,654 (single)
Inclusive of TAX FREE supplements*

Duties:

The upkeep of the I.B.M. 370/145 dos/VS installations assembler systems and software plus the generation and maintenance of the operating systems and associated software.

This will entail advice and assistance to programmers and analysts, evaluation of new software packages and the liaison with manufacturers and suppliers.

Qualifications:

Candidates should possess GCE 'O' level with good passes in English and Mathematics. Minimum of seven years experience in Data Processing with at least three years experience as a systems programmer or two years as a Systems Analyst and two years as a Systems Programmer on major projects. Or a university degree or professional qualification of a recognised body, by examination with a minimum of five years experience in Data Processing of which two years must have been as a Systems Programmer on major projects.

*The British Government pays TAX FREE supplements to British Nationals. These supplements are reviewed annually but at the present time are up to £8,264 (married) and £3,582 (single). The salaries quoted are at the current exchange rate with the Rhodesian and subject to fluctuation.

As well as salary and supplements you will also be entitled to a TAX FREE terminal gratuity, low cost accommodation and free passages. Together, these add up to exceptional real earnings. The salary quoted is the maximum on the scale and starting salaries will relate to qualifications and experience.

For those receiving supplements the British Government also gives appointment grants, education allowances, car loans, medical aid assistance and free holiday visits for children educated in Britain.

For further information please send full personal/professional details (without obligation and in total confidence), to: Recruiting Officer, Zambia High Commission, 7-11 Cavendish Place, London, W.1.

YORKSHIRE & HUMBERSIDE VACANCIES

HULL COBOL PROGRAMMER
£4,500
Programmer for development work on production and business systems. The position would suit a person with 2/3 years' commercial experience. New hardware. Relocation is available if necessary.

LEEDS BASIC + PROGRAMMERS
to £4,500
BASIC+ programmers required for progressive installation. PDP hardware linked to IBM mainframe. Opportunities for progression to Analyst/Programmer would be envisaged in near future.

LEEDS COBOL PROGRAMMERS
£4,200
ICL COBOL programmer required for fast moving environment - must have at least two years' commercial experience for this ICL on-line installation.

LEEDS COBOL PROGRAMMER
£4,500
COBOL programmer required for expanding IBM installation. Must have experience of DOS/VS-power. CICS would be an advantage. Sound commercial background is required. Excellent opportunity to further your career from within.

LEEDS SYSTEMS ANALYST to £8,000
Systems Analyst required for an expanding IBM installation running under DOS/VS, CICS would be an advantage. Current application areas include production control, common manufacturing systems, stock & Sales control/evaluation etc. User Liaison. Restaurant facilities and flexi-time in operation at the DP centre.

BRADFORD - SYSTEMS ANALYST to £8,600
Systems Analyst required for heavy engineering company. Must have at least 3 years' systems experience. The installation is a small one with plenty of scope to use initiative. RPG 11 background would be useful. Excellent fringe benefits.

SOUTH BRADFORD SYSTEMS ANALYST £6,000
An expanding bureau has a vacancy for an experienced systems analyst to work on customer systems/in-house. This is an excellent position for analysts who wish to further their career.

SOUTH BRADFORD SYSTEMS ANALYST £6,800
Systems Analyst required for professionally run DP department. Must be able to communicate at management level. A good sound commercial background is required for this important position.

LEEDS - PAYROLL ANALYST - £8,000
Our client is looking for a systems analyst with payroll systems and package experience. Responsibility initially for all payroll systems with expanded responsibilities later.

LEEDS TRAINEE ANALYST - £4,200
Our client is looking for an Assembler programmer who is seeking to advance his/her career. The installation is IBM and presently under expansion. Ideal opportunity for a programmer wishing to move into systems work.

BRADFORD SYSTEMS PROGRAMMER £5,000
Systems Programmer for 370/148-on-line installation with 2/3 years systems programming experience. Must be able to communicate at User level. Training of systems programmers over a 2 year training path. Excellent career prospects.

LEEDS OPERATOR OPS MANAGER – £5,750
Dynamic Leeds installation requires Shift Leader with ICL hardware experience for early promotion to deputy operations manager. Multi-machine environment with teleprocessing.

To find out more about these and many other vacancies we have available, simply ring IRENE ROGERS or write to our Leeds Office. Interviews can be arranged to suit you.

"If you're considering a move then you should contact Lorien first."

LORIEN COMPUTER SERVICES

OCS House, Servia Road, Leeds LS7 1NJ
Telephone 0532 44485

SYSTEMS ANALYSTS

AYLESBURY

(Up to £6,300)

- Expanding a successful financial application suite
- Applying OCR techniques
- Developing financial models

The Installation:

- ICL 1903S and 1901T (new ranks being evaluated)
- Redifon Keycheck
- OCR Reader

The Qualification:

- Two years' good system work, preferably with accounting background
- Training in techniques, e.g. OCR and Prosper will be given where necessary

Telephone (reverse charges) or write to:

R. H. Brazier
D.P. Manager
Redifusion Central Services Ltd.
P.O. Box 80
Aylesbury, Bucks. HP19 3DU.
Telephone Aylesbury (0296) 81331

REDIFFUSION

IBM SHIFT LDR — £5300
An excellent opportunity exists for an experienced IBM operator to work with a leading financial organisation. The successful applicant, who should be both mature and self-motivated, will possess a thorough understanding of DOS VS with POWER & CICS, together with a good knowledge of utilities. Benefits include free canteen, free life assurance and 4 weeks' holidays.

C. LONDON

IBM OPERATORS — £4500
We currently have vacancies for operators at two Banking organisations with mid range IBM 370 hardware. Applicants should possess approx. 12 months DOS VS experience with POWER or ORASP and can choose between a 2 or 3 shift system. Excellent fringe benefits including subsidised restaurant.

C. LONDON

BURROUGHS SEN OPS — £4500+
Our client, a leading commercial organisation situated in S.W. Surrey require Senior Operators and Operators with experience of Burroughs hardware. The installation comprises a mid-range Burroughs 3000 series machine, shortly to be replaced by new range equipment, run on a 2 shift system. Benefits include annual bonus, free lunches and staff discounts.

SURREY

OPS SUPERVISOR — £4500
This is an excellent opportunity for a Senior operator to progress to Junior Management with a 2903 installation. Duties will include the training of ODE operators. This position will be particularly attractive to those with a knowledge of macro's, seeking programming involvement.

CITY

ICL DAYS ONLY — £2300
2903 experience? Our client is seeking an operator whose duties would include the supervision of ODE/VDU operators.

CITY

PROG/ANALYST — £7,500+
Quite frankly your knowledge of IBM DOS is limited and you're fairly inventive with new projects, then working with this young team will give you insight into the exciting world of systems and development.

SOUTH LONDON

IBM OPERATOR — £4100
This major manufacturing company requires an operator with approx. 12 months OS VS1 experience to work on an 'IBM 370/148'. A good shift system incorporating rest days is in operation and the usual large company fringe benefits are offered.

MIDDX

OPERATIONS — VARIOUS

ICL 1900	3 yrs	B3		Reading	£5800
NCR Century	12 mths	B1/B3	3-shift	C. Lon.	£4200
IBM 360	9 mths	DOS	3-shift	Surrey	£3200
IBM 370	9 mths	DOS VS	3-shift	Herts	£3800
2970	18 mths	3rd Gen	3-shift	Surrey	£4500 +
1900	6 mths		2-shift		£4900
2903	9 mths		2-shift		£3800
2960 - B 3 4	12 mths			Swindon	£4900
Univac 9030	12 mths		DAYS	N. London	£3500

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or Tel: 223 7334

ANALYST PROGRAMMER

PERTH, SCOTLAND

JOHN DEWAR & SONS, LIMITED
SCOTCH WHISKY BLENDERS AND BOTTLERS

REQUIRE an analyst/programmer to work at their Scottish Office.

THE JOB involves working in a small team on the specification and implementation of systems on a Honeywell Series 200 Computer, covering a wide range of business applications.

A depth study is currently being carried out to determine the company's hardware requirements for the 1980's.

APPLICATIONS are invited for the above post from persons with a minimum of three years' programming experience, preferably in COBOL. Experience of Honeywell computers, although not essential, would be an advantage.

Write for an application form to the
Systems Manager
John Dewar & Sons Limited
Inveralmond
PERTH

NORTHERN REGIONAL HEALTH AUTHORITY

SENIOR SYSTEMS DESIGNER

The Northern Regional Health Authority require an experienced systems analyst to head a team of Systems Programmers involved in developing systems in the Health Service. The work carried out includes hospital, nursing, financial and community health systems.

Future developments will include the implementation of systems on terminals and small computers in the hospital environment.

We offer:

- ★ A challenging position in Health Service Computing.
- ★ A modern Computer Centre housing a 98K 1904S running under George 3
- ★ On-line program development techniques via VDU's.
- ★ 37 hours flexible working week.
- ★ Salary Scale of £5537-£6715.

New entrants to the NHS will normally start at the minimum of the scale.

Application form and job description available from the Regional Personnel Officer, Northern Regional Health Authority, Benfield Road, Walkergate, Newcastle upon Tyne NE6 4PY. Closing date: 25 August, 1978.

TECHNICAL SUPPORT

£5750, CAR, EXPENSES, TRAVEL, PENSION

If you have a minimum of 3 years' IBM DOS or DOS/VS experience as an operator or programmer and a knowledge

- ★ JCL
- ★ ASSEMBLER
- ★ CORE DUMPS
- ★ SYSTEM GENERATION

and enjoy

- ★ TRAVELLING
- ★ MEETING PEOPLE
- ★ BEING INDEPENDENT

then software development with an established world-wide organisation could be the exciting career you have been searching for.

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nycc

2976 Our present system

NORTH YORKSHIRE COUNTY COUNCIL

Require computer personnel with the necessary experience and drive to join an energetic team of computer professionals engaged in developing applications for a large ICL 2976 computer providing comprehensive Batch, RJE, MAC and TP facilities for a variety of users under VME/B

SYSTEMS ANALYST/PROGRAMMERS — Salary up to £5073

To be responsible as senior members of project teams for the investigation, design and implementation of systems.

Experience of COBOL and systems analysis will be advantageous with working knowledge of a sophisticated operating system desirable.

SYSTEMS PROGRAMMERS — Salary up to £5073

To supplement the existing software team in the implementation and maintenance of VME/B and associated superstructure.

Experience of a large operating system is essential, preference will be given to candidates with experience of VME/0 or George 3.

PROGRAMMERS/ TRAINEE PROGRAMMERS — Salary up to £3651

With experience of COBOL essential and a working knowledge of a large operating system desirable.

STARTING SALARIES WILL BE PAID ACCORDING TO EXPERIENCE

The Council's administrative headquarters in the market town of Northallerton is in the heart of the North Yorkshire countryside close to the North Yorks Moors and Dales National Parks, York and Harrogate.

A large selection of attractive and reasonably priced properties are available within the town and surrounding villages. The Council will pay removal expenses, assistance with legal fees, disturbance allowance and lodging allowance where appropriate.

If you consider your experience and ability to be suitable, then write giving full details, together with the names of two referees to The County Treasurer, County Hall, Northallerton, North Yorkshire DL7 8AL. Tel: (0609) 3123 Ext. 516.

APPLICATIONS TO BE RECEIVED BY 31st AUGUST 1978

Have you the skill, the flair and the personality to manage our Computer Operations?

We're not just looking for someone who can step into our Computer Operations and take over the job as it is, we're looking for someone with flair, imagination and the technical expertise to really make an impact.

Our installation comprises of our own In-House and terminal equipment running into an IBM 370/158 under MVS and as our Computer Operations Manager you will be responsible for the Data Control, Data Preparation and Operations Sections. We shall look to you to implement tighter procedures in these areas and will offer you wider involvement to develop the effectiveness of the section.

You must already be working in a department where work is submitted to a mainframe and are probably a shift leader or manager looking for greater responsibility and freedom. Ideally you will have IBM/JCL experience and will be currently earning in the region of £5,500 p.a.

As a rapidly expanding company which is already the largest independent supplier of Remote Batch Terminals, Data 100 offer you a stimulating and highly progressive working environment coupled with unrivalled career growth prospects. For further details please contact Mike Bell, Data 100 Ltd. Maxted Close, Hemel Hempstead, Herts HP2 7BG. Tel: Hemel Hempstead 61281.

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PROGRAMMERS & ANALYSTS

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BOB EDWARDS TODAY

Datascene Recruitment Limited

Sceptre House 169-173 Regent Street London W1R 7FB

01-439 1856 24 hour answer phone

Senior Systems Analyst Systems Analyst Programmer

Wyeth Laboratories have modern offices situated in attractive grounds at Taplow, Maidenhead, Berkshire and a Pharmaceutical Production Unit at Havant, Hampshire.

The Data Processing Department at Taplow is to provide a teleprocessing service to the Havant location in 1979 and the above appointments are to be made to develop and implement production control and accounting systems.

All applicants should have some programming experience and a knowledge of IBM DOS. The Programmer must be able to demonstrate a working knowledge of PL/1.

Applicants for the Senior Systems Analyst and Systems Analyst positions must have had at least three years commercial systems experience and applicants with teleprocessing experience will be preferred.

Please apply giving details of age, experience, and present salary to:—
Mrs. J. Andrews, Personnel Officer, Wyeth Laboratories, Huntercombe Lane South, Taplow, Maidenhead, Berks. Telephone: Slough 28311.

Wyeth Laboratories

SURREY

PROGRAMMER	1 year's RPG II	To £6,500
SYSTEMS ANALYST	1 year's analysis & database	To £6,000
SYSTEMS ANAL/PROG	Or RPG II prog to learn analysis	c. £5,600
SYSTEMS ANALYST	2 years' financial systems	c. £5,500
SOFTWARE PROGRAMMER	2 years' experience	£5,500
SYSTEMS PROGRAMMER	18 mths' IBM Assembler	To £5,000
PROGRAMMER	2 + years' Cobol	To £5,000
PROGRAMMER	Plan & Cobol	To £5,000
PROGRAMMER	Fortran/PL I	To £5,000
SYSTEMS ANALYST	3 years' financial systems	To £5,000
PROGRAMMER	18 months' Cobol Honeywell 66	To £5,000
PROGRAMMER	2 years' low level language	c. £5,000
SYSTEMS ANALYST	2 years' experience	c. £5,000
PROGRAMMER	RPG II will train in Cobol	c. £5,000
PROGRAMMERS	1 year's experience	c. £5,000
PROGRAMMERS	18 months' experience	c. £4,800
PROGRAMMERS	18 months' commercial ideally PL/1	To £4,760
PROGRAMMERS	1 year's experience	c. £4,000

For further details and an application form please phone or call in.

AMES PERSONNEL

TELEPHONE: 01-767 0611

Sutton, Surrey

The Crown Agents operate as financial, professional and commercial agents for about a hundred foreign governments and many more overseas public authorities and international organisations.

The Computer Division is located at Sutton in Surrey and a Honeywell Level 66/05 has recently been delivered to replace the H.1250 and H.1015 already installed.

Systems Analyst Up to £6,250

There is an immediate vacancy for a Systems Analyst to join an established team working on advanced systems for the banking and investment departments using on-line and data base techniques. Qualifications required are at least five years' data processing experience including systems design and implementation.
MH/721/CD

Analyst/Programmer Up to £5,400

An Analyst/Programmer is required to work on advanced data processing systems using Honeywell IDS and TDS software. Applicants should have at least three years' programming experience and a knowledge of Level 66 GCOS would be an advantage.
MH/722/CD

For further details and application form please telephone Miss Horne (01) 222 7730 ext. 3362, or write, quoting the appropriate reference.

Crown Agents

The Crown Agents for Oversea Governments and Administrations, Recruitment Division, 4 Millbank, London SW1P 3JD.

Senior Programmer

Salary up to £4,982 per annum (including supplements). Ref. P.13.

Programmers

Salary up to £4,478 per annum (including supplements). Ref. P.6.

required in the computer section at Nugent House for the development of new and existing programmes in a range of financial and non-financial systems.

Applicants for the senior post should have a minimum of two years' COBOL and/or PLAN experience, preferably with an ICL 1900 operating under GEORGE 3.

Applicants for the Programmer posts should have a minimum of 18 months' similar experience.

Appropriate training would be given to outstanding candidates for either post.

The Division operates an ICL 1903T computer (shortly to be upgraded) operating under GEORGE 3 with a variety of terminals, including 1600, 7502 and 8959. The Authority is currently preparing plans for its future hardware and software developments.

Excellent conditions of service apply including a contributory pension scheme, a flextime scheme based on a 35 hour, five-day week, plus generous sick leave and holiday entitlements. There is also a staff restaurant and an active Social club.

Applications should be submitted on forms available from the Personnel Office, Thames Water, Thames Conservancy Division, Nugent House, Vastern Road, Reading RG1 8DB. (Tel. Reading 593331).

Closing date, 24th August, 1978.

Thames Water

THANET JOINT COMPUTER COMMITTEE

require

SYSTEMS ANALYST/PROGRAMMER

To work for a go-ahead Seaside Organisation
AP5/SO1 £4,773-£5,588 (inc. of supplement)

The Thanet Joint Computer Committee, who provide computing service with a Honeywell 62/40 for the Thanet and Dover District Councils, require a suitably experienced person to head one of the two-man analyst/programmer teams maintaining existing systems and developing sophisticated new systems. Consideration is being given to the use of on-line applications by both user authorities.

Applicants should preferably have a sound knowledge of systems analysis in local government and programming in COBOL.

Consideration will be given to housing accommodation and a generous disturbance allowance scheme is in operation.

Closing date	28th August, 1978
Interview date	6th September, 1978

Applications giving full details of experience to date to:

The Computer Manager, Thanet Computer Centre, Haine Road, Ramsgate, Kent CT12 5AA.

THE LONDON HOSPITAL MEDICAL COLLEGE (University of London)

SUPERVISOR OF COMPUTER SERVICES

Applications are invited for the above post from graduates and/or those holding an appropriate professional qualification.

The appointee will be in charge of the computer section which has a staff of five currently. A PDP 11/10 computer is used for both local processing and as a remote terminal to the computers in London University.

The post requires both administrative and programming ability. A first degree in mathematics would be helpful though not essential. Applicants should be graduates or have an equivalent professional qualification.

Salary will be on the Grade II Scale, £5,984 to £7,308 plus £450 London Allowance per annum. (Salary Scales will be reviewed from October). Superannuation within the USS.

Further details from the Secretary, The London Hospital Medical College, Turner Street, London E1 2AD to whom applications (two copies) together with names of two referees should be sent within 21 days.

BARRATTS

HAVE A VACANCY FOR A

PROGRAMMER

Applicants should preferably have a minimum of one year's COBOL or plan experience.

The current computer is a 48K 1901T with tapes and discs used in conjunction with off-line OMR. The successful applicant will join a small team working on a wide range of commercial applications in an expanding DP Department. A generous salary will be paid according to experience.

For an interview ring or write to:

Mr. S. H. Clipston, Personnel Manager
STYLO BARRATT SHOES LTD.
Footshape Works, Kingsthorpe Hollow
Northampton. Telephone 715500

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★Why not consider moving to a more rural area-relaxed country atmosphere

★Take a step up the ladder-Learn new techniques-improve your prospects

★Increase your salary-consider the perks!

IBM PROGRAMMER — LONDON

Our client, a prestige bank retaining large IBM equipment and mini equipment seeks programmers with at least 18 months' IBM COBOL experience. This is a great opportunity for a competent and ambitious programmer to join a professional team. Company offers —
- ★ Excellent promotion prospects
- ★ Training in teleprocessing
- ★ First-class working conditions
- ★ Personal loan scheme and cheap mortgage
- ★ Salary c £6,000

Ref. 1388

MINI PROGRAMMER — KENT

Our client is an international company based in a busy main town surrounded by beautiful countryside. They seek a programmer with 18 months' DEC PDP 11 and BASIC + experience. The hardware is newly installed, offering new development in both manufacturing and financial areas.
- ★ A challenging position with opportunities in a variety of areas.
- ★ Surrounded by picturesque scenery and where housing is very cheap.
- ★ Above average terms and conditions including 4½-day week.
- ★ Salary to £5,500.

REF. 1899

PL/I PROG — LONDON

Due to expansion and to cater for future needs, this well-established D.P. services division retaining IBM 370 with extensive T.P. network, seeks PL/I programmers with minimum 2 years' exp. Company offers:—
- ★ Continuous development of both commercial and financial applications
- ★ Opportunity to learn CICS and Database techniques
- ★ Promotion prospects within a progressive organisation
- ★ Excellent perks including STL5, staff restaurant
- ★ Salary £8,000

REF. 1479

SYSTEM ANALYST — LONDON

Our client, a prestigious Merchant Bankers, are seeking a Systems Analyst who has either financial or insurance experience. They retain IBM 370 under DS but will consider other hardware experience.
Company offers —
- ★ Full banking benefits including subsidised mortgage
- ★ Excellent working environment
- ★ Job security with prestige concern
- ★ Salary £7,500

REF. 1594

JUNIOR PROGRAMMER — LONDON

Multi-national company retaining large IBM 370 hardware requires programmers with at least 12 months' ASSEMBLER experience to join highly professional team. They are currently developing a major sophisticated on-line systems.
Company offers —
- ★ Highly progressive organisation
- ★ Continued development with a well planned schedule
- ★ Excellent benefits including cheap travel
- ★ Good promotional prospects
- ★ Salary to £8,000

REF. 1290

ANALYST PROGRAMMER — S.E. LONDON

Our client, a major British insurance company in South-East London, seeks an analyst programmer with at least 12 months' analysis experience. They retain ICL 2980 using COBOL although they will consider people with any hardware experience. Ideal applicant will preferably have some insurance experience. Company offers.—
- ★ Excellent prospects for career path
- ★ Scope in a variety of areas
- ★ Good perks which include 2 Bonus a year
- ★ Salary £8,000

REF. 1595

PROGRAMMER — SURREY

World leaders in their field, this organisation has an impressive varied range of business interests and is rapidly expanding. At their computer centre they have IBM 370, mini computers and additional new equipment scheduled, consequently needing programmers with minimum 18 months' COBOL, ASSEMBLER or RPG II exp. to work as part of project group.
Company offers:—
- ★ Opportunity to go into analysis, with good scope
- ★ Fantastic working conditions, including large sports and social club
- ★ Paid overtime, flexi time, insurance cover
- ★ Subsidised staff restaurant
- ★ Salary to £5,600

REF. 1972

SENIOR PROGRAMMER — CAMBRIDGESHIRE

Our client, a manufacturer of high precision instruments, situated in the beautiful rural surroundings of Cambridge, seeks a senior programmer to work on newly installed PDP 11 under RSMII and BASIC +. Ideal applicant will have at least 2 years' experience of BASIC or BASIC +, company will consider other MINI hardware experience.
Company offers:—
- ★ Variety of new development work
- ★ Flexi hours
- ★ Beautiful rural surroundings with reasonable house prices
- ★ RELOCATION expenses
- ★ Salary £8,500

REF. 1690

SENIOR PROGRAMMER — OXFORD

Our client is a major manufacturer of construction materials throughout the U.K. with turnover exceeding £200m. Running a modern computer centre and operating an ICL 1901T (upgrading shortly) they wish to appoint a Senior Programmer. Successful applicant will have a comprehensive COBOL experience with PLAN & FILETAB an asset.
- ★ Working on own initiative with minimum of supervision
- ★ Opportunity to work in small, friendly department
- ★ Relaxed picturesque surroundings not too far from the beautiful city of Oxford (Due to the location applicants should have own transport)
- ★ RELOCATION expenses will be negotiable
- ★ Salary to £5,500

REF. 1878

ANALYST PROGRAMMER — WILTSHIRE

Our client, a major preservation society based in rural Wiltshire, have vacancies for analyst programmers with at least 18 months' RPG II experience. They are involved at present in taking over all major systems from their head office and have their development work planned for the next 5 years. Company offers.—
- ★ Variety of exciting new development work
- ★ Beautiful rural surroundings with very reasonable house prices
- ★ Generous RELOCATION assistance
- ★ Salary £5,000

REF. 1837

ANALYST PROG — HERTS

One of the country's leading retail organisations seeks analyst programmers to work at team leader level on the development of new batch, interactive and distributed systems. Company currently retain Burroughs B3700/4700 series Hardware and are also investing in PDP11 equipment. They seek persons with 2 years' experience in design analysis and/or programming (any language) to make a career with them.
Company offers:—
- ★ Universal opportunity to learn new languages and get on to MINI computers
- ★ Significant user contact
- ★ RELOCATION expenses
- ★ Salary to £8,160

REF. 1666

PROGRAMMERS — MIDDX.

A major organisation in the retail trade is now pursuing further interests at a rapid rate. Retaining NCR Century equipment with new Criterion V 8580 scheduled for delivery at the end of the year, they seek programmers with 3 years' COBOL experience on any machine for their major stock control systems UTILISING TOTAL database.
- ★ Plenty of new development work
- ★ Training in database
- ★ Sports and social club in beautiful grounds, heated swimming pool, squash club, etc.
- ★ Excellent perks, LV, discount on company goods
- ★ Salary to £6,250

REF. 1658

CHIEF PROGRAMMER — LONDON

Our client, a major national retail organisation, seeks a chief programmer to take control of 15 programmers. Company retains IBM 370 to which a 3031 will be added shortly. Ideal applicant will have at least 5 years' programming experience in an IBM environment using ASSEMBLER, COBOL and DL/I. Job entails full management responsibilities and person will be expected to play a leading role in implementation for improved programming techniques.
Company offers —
- ★ Progressive organisation
- ★ Flexible hours
- ★ Full-scale projects
- ★ Excellent fringe benefits which include free lunch and discount on company products
- ★ Salary to £8,000

REF 1674

PROGRAMMER — MIDDX.

One of the most significant forces in the computer services industry in the U.K., our clients provide a comprehensive range of services to clients worldwide, retaining IBM 370. Company seek programmer with minimum 18 months' COBOL and/or PL/I experience.
They offer.—
- ★ Moves with programming into systems analysis of sales support to join one of their specialist groups
- ★ Chance to move on to MINI computers
- ★ Located within easy reach of London
- ★ Relocation expenses
- ★ Salary £5,500

REF. 1451

IBM PROGRAMMERS — KENT

Our client, an international pharmaceutical company, seeks programmers to join their rapidly expanding DP dept. They retain IBM 370 and require people with minimum of 12 months' COBOL experience, preferably under DS. Company offers excellent opportunities for movement into systems analysis, design and software support. Company offers —
- ★ Full training in TP and IMS Database
- ★ Flexi hours
- ★ Excellent facilities for career development
- ★ First-class perks which include sports and social club, subsidised restaurant, pension and sick scheme
- ★ Salary to £5,500

REF. 1619

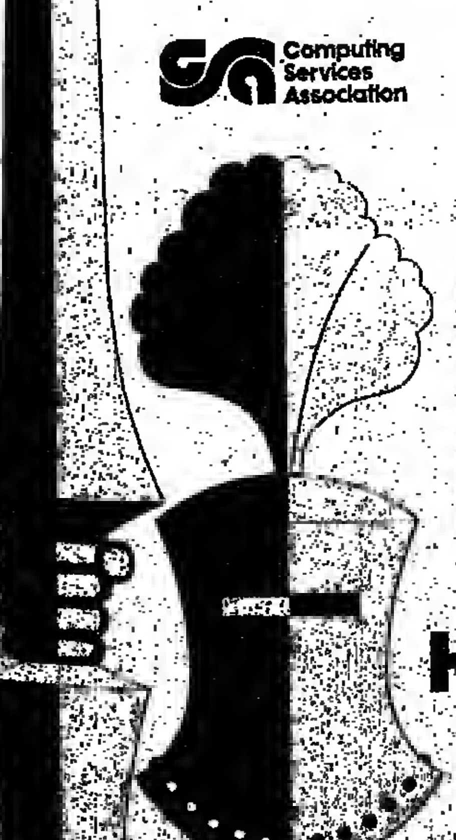
PROGRAMMERS — ESSEX

Management services division of major British group with annual turnover of almost £1000m seeks COBOL programmer with minimum 2 years' IBM or ICL COBOL within a project team. Programmers will become involved in programme design, coding testing, documentation and maintenance as well as assistance in systems implementation. Company offers:—
- ★ Comprehensive range of applications
- ★ Opportunity to move to more advanced technical projects and a variety of languages and machines
- ★ Paid overtime — flexi hours — subsidised restaurant amongst many of the excellent perks
- ★ RELOCATION expenses
- ★ Salary to £5,500

REF. 1624

Computing Services Association

For further details of the above positions and of the many others we have available in urban and rural areas — please ring our London office: 01-734 0152/3010.



CONTRACT DIVISION

OVERSEAS

MESSAGE SWITCHING BURROUGHS DEMCOS	HOLLAND	£450 p.w.
PDP FORTRAN	BELGIUM	£400 p.w.
HONEYWELL 6000 GCOS COBOL	BELGIUM	£NEG p.w.
PDP RSXIIM LONG CONTRACT	GERMANY	£EXCELLENT p.w.
NCR 8200 IMOS COBOL	HOLLAND	£330 p.w.
PROGRAMMER PL/I LONG CONTRACT	PARIS	£300 p.w.
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ICL 2960/70 IDMS	BELGIUM	£300 + p.w.

U.K.

ANALYST PROG IMS COBOL	BEDS	£230 p.w.
IMS PROGS COBOL	HERTS	£230 p.w.
PDP RSXII FORTRAN	BERKS	£230 p.w.
SNR ANALYST DATABASE DESIGN	HERTS	£240 p.w.
BURROUGHS 6700 COBOL	SURREY	£200 p.w.
PDP RSTS/E BASIC +	HERTS	£200 p.w.
ANALYST PROG IMS	HERTS	£230 p.w.
ICL COBOL DII DRIVER	HERTS	£190 + p.w.
SNR PROG COBOL T.S.O. VSAM DOS VS	C. LONDON	£240 + p.w.
DOS/VS COBOL TSO VSAM	C. LONDON	£220 p.w.

Phone now for immediate and future contracts

Ring Christine Kay/Dave Hayton, 734 0152 (24 hrs.)

KNIGHT PROGRAMMING SUPPORT LIMITED

27 NOEL STREET, LONDON W1. TELEPHONE: 01-734 0152/6 (24 HOURS)

OFFICES: AMSTERDAM, PARIS, MANCHESTER, BIRMINGHAM

COMPUTING AT CHRYSLER

Our modern Computer Centre at Whitley in Coventry serves the entire Chrysler Organisation in the United Kingdom.

Equipment includes a twelve channel 4 megabyte Amdahl System 470/V6 machine and a 2 megabyte IBM 370/155 CPU with an AMS PSU feature. Both CPU's are linked to a wide variety of peripheral equipment including new 6250 BPI tape drives.

Computer Operators

Applicants should have at least 18 months operating experience on IBM equipment preferably 370's. Three shift working is involved and overtime at weekends may be required, for which attractive premiums are paid.

Operations Analysts

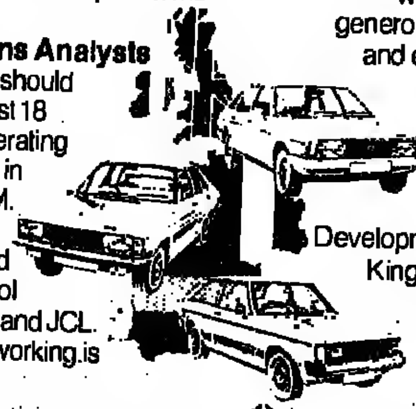
Applicants should have at least 18 months operating experience in a large I.B.M. installation and a sound knowledge of IBM Utilities and JCL. Three shift working is involved and overtime at weekends may be required, for which attractive premiums are paid.

Project Support Personnel

Education to degree standard or A level required. Applicants should have 3 years Data Processing experience. Sound knowledge of IBM operating system, Utilities and JCL essential. Knowledge of programming in COBOL or Assembler desirable.

Chrysler offers a high level of job satisfaction, good salaries and career prospects, and a pleasant working environment. Fringe benefits include contributory pension scheme with free life assurance, generous holiday entitlement and employee discount on Company products.

Please contact Mrs. A.E. Jones, Recruitment and Management Development, Chrysler United Kingdom Limited, Whitley, Coventry. CV3 4GB. 0203 303505 Ext.432.



Driving ahead in Europe CHRYSLER UNITED KINGDOM LIMITED

DATA PROCESSING MANAGER

Up to £7,000 & car
Atherton

TI Bainbridge Silencers Ltd., is a member of the successful Tube Investments Group employing over 800 people and with a turnover exceeding £20m. It is the largest manufacturer and distributor of replacement vehicle exhausts in the UK with seventeen depots extending from Devon to Scotland.

This is an important and challenging new post in which the successful candidate, located near Bolton, will accept responsibility for developing existing systems and introducing new applications.

He/she will have three subordinate staff. The two major facets of the job will be the co-ordination of the internal system with the TI-Central Computer Unit, and the introduction of mini-computers into the depot network.

Applicants should hold a relevant degree or equivalent qualification supported by sound basic DP experience and have had at least three years in the management of multi-site computer installations, preferably in the distribution business. Practical knowledge of control procedures and management information systems is essential.

Anyone under 30 years of age is unlikely to have the necessary experience to successfully undertake the duties of this post.

Conditions of employment are first class and include pension scheme, free life assurance and discount on all TI Group products.

For an informal discussion telephone 0204 71651 or please write with brief career details to:

E. Adamson, TI Bainbridge Silencers Ltd., Booth Road, Little Lever, Nr. Bolton, Lancs.

TI Bainbridge Silencers

A member of the TI Steel Tube Division

To £8K — BASIC PROG. — N. Herts
Generous company benefits are offered by very substantial international service organisation to BASIC programmers with solid commercial experience of two or more years on PDP 11 systems.

To £7K — ASSEMBLER PROG. — London
This is a London based appointment but initially the successful applicant will work, expenses paid, for some months in Scotland completing a project there. Two years experience and RSX 11 and MACRO 11 preferred.

c£8K — ANALYST/PROG. — N. Herts
This vacancy involves liaison with users and other departments of a professional organisation. Looking for two years assembler (pref. PLAN), mini experience (pref. DEC).

168 Finchley Road, London, NW3 6HP

COMPUTECH 01-794 0202

HOLLAND

SENIOR PROGRAMMMERS £10,000

With experience in:
- COBOL modular programming
- DOS/VS
- CICS
- DL/1

Send your career details to:
The Personnel Officer
Hunter Douglas Ltd.
Walton-on-Thames

Hunter Douglas Ltd

Systems Support Engineers
High salary and excellent prospects in Germany

ITEL is one of the world's largest suppliers of IBM – compatible mainframes, marketing and maintaining a wide range of products throughout the United States and Europe.

As a result of continued expansion, we are now seeking two Systems Support Engineers for our German operation – one to be based in Munich (who should speak German fluently) and the other to be based in Stuttgart (where German, though desirable, is not essential). Itel will help those who wish to learn German by *providing assistance with both the time and cost of tuition.*

These S.S.E.'s will have full responsibility for ... the provision of advice and guidance to Itel's customers regarding new operating system releases, new hardware announcements, and changes in hardware configurations. Planning and sales support will supplement debugging and general areas of system engineering.

The work is varied and in addition there is no risk of losing contact with the rapid advances being made in computer technology – Itel ensures that all its staff are kept up to date with the latest developments by providing training facilities for that purpose.

Candidates should have experience with IBM large systems, 370/158 and upwards, plus a good knowledge of Internals. Knowledge of MVS, SVS, VM or DOS/VS is desirable.

Salary and benefits are generous – Itel can offer you a great deal. Why not give us a call, you've nothing to lose.

Send a C.V. or make a reverse-charge telephone call in confidence to: Chris Worrall – Itel Deutschland Informations – Systeme GmbH, Euro-Haus, Lyonerstrasse, 26, 6000 Frankfurt/Main, West Germany. Tel: (611) 66891.

ITEL INTERNATIONAL

Readvertisement

Portsmouth Polytechnic
DEPARTMENT OF CHEMISTRY
Research Assistant

to work on the solution of mathematical problems in chemical and enzyme kinetics.

Applicants should possess an Honours degree in Mathematics, Chemistry or Physics. Experience in computer programming will be a considerable advantage. The person appointed will be expected to register for a higher degree.

Appointment is initially for a period of 2 years.

Salary scale: £2,589 to £2,643 per annum.

Application forms and further particulars from the Staff Officer, Portsmouth Polytechnic, Alexandra House, Museum Road, Portsmouth PO1 2QQ, to whom completed applications should be returned by 30th August, 1978.

Please quote Ref. D50.

QUEEN MARY COLLEGE
University of London

COMPUTER ASSISTED TEACHING UNIT

Faculty of Engineering

Applications are invited for a 2-year appointment as MANAGER of the Unit. Candidates should be honours graduates in Computer Science, Engineering or Science subjects with experience in programming and operating systems development, preferably in relation to interactive multi-access systems utilising graphical display. High level languages used are FORTRAN and BASIC. Duties include supervision of the Unit, based upon a PDP-11/40 multi-access system and, in collaboration with academic staff, development and documentation of teaching packages in Engineering Science. Salary scale £4134-£5628 p.a. (including London Allowance).

Application forms and further details available from Dr. R. R. Smith, C.A.T.U., Queen Mary College, Mile End Road, London E1 4NS.

LEICESTER POLYTECHNIC

SCHOOL OF ELECTRONIC & ELECTRICAL ENGINEERING

COMPUTER SYSTEMS ENGINEER

To supervise the day-to-day operation of a disk based Data General Nova Minicomputer.

In addition, the engineer will be required to develop hardware and software for a variety of minicomputer and microprocessor systems.

A degree in Electronic or Electrical Engineering or Computer Science is normally required for this post. Experience of computer hardware and software would be an advantage.

Salary £4775-£5073 plus pay supplement of £518 or £520 p.a. Phase 3 review expected 1st July 1978.

Application form and further details available from Staffing Officer, Leicester Polytechnic, P.O. Box 143, Leicester LE1 9BH. Tel. (0533) 50181, Extn 2301.

Chief Programmer

Crawley, Sussex

A major international group seek an experienced person to fill this important computer vacancy at their Crawley Engineering Complex. The computer department supply a service to production, accounts, design and sales departments. GEC and Prime computers support 80 terminals in the offices and factory and in associated companies as well as Batch Processing services.

The successful applicant will supervise and schedule programming within the department and be responsible for establishing and supervising programming standards and disciplines. It is essential that the job holder has a sound education to degree standard, followed by six to ten years' experience of data processing, part of which should have been in a supervisory capacity.

An attractive salary and relocation package, if applicable, is being offered.

For further details of the job, salary, and company please contact:

David Gutton
Senior Personnel Officer
APV Co. Ltd.
P.O. Box 4
Manor Royal, Crawley
Sussex
Telephone:
Crawley 0293 27777

APV

PROGRAMMERS AND ANALYST

Circa £2,000 to £5,500 negotiable

We are an established software house in commercial applications and require the following staff to work on visible record and mini computers.

ANALYST — having one year's systems practice in addition to a sound programming background.

PROGRAMMER — having at least one year's programming experience.

JUNIOR PROGRAMMER — having up to one year's programming experience.

TRAINEE PROGRAMMERS — having completed a university or technical college course in computer science.

Applications in writing stating full details of experience, employer, age and salary to:

Simdell Ltd.
Dale Buildings, Cook Street, Coventry
or telephone Coventry 51805

CONTRACTORS

Up to £250 p.w. with E.M.S.

ANALYSTS COMMERCIAL—NORTH-WEST
ANALYSTS BANKING—LONDON
IDS DESIGNERS—SURREY
PROGRAMMERS HONEYWELL LSS—COBOL—ENTIRE U.K.
PROGRAMMERS HONEYWELL IDS—NORTH-WEST, MIDLANDS & SURREY
PROGRAMMERS—MINI SYSTEMS—SOUTH MIDLANDS
PROGRAMMERS—IBM CICS—MIDLANDS
PROGRAMMERS—FORTRAN—NORTH-WEST
PROGRAMMERS—IBM DOS/OS COBOL—LONDON
PROGRAMMERS—PL/1—LONDON AND SOUTH
PROGRAMMERS—ASSEMBLER—MIDLANDS
ANALYSTS AND PROGRAMMERS—LOCAL AUTHORITY EXPERIENCE—U.K.
PROGRAMMERS—COBOL BURROUGHS—SOUTHAMPTON
PROGRAMMERS—HONEYWELL COBOL—DURHAM
PROGRAMMERS—HONEYWELL COBOL—LONDON

NORTH WEST — ANALYSTS

Packages to £7,500 + O/T pay

The E.M.S. consulting group has a large quantity of vacancies for additional Analysts to handle expanding systems requirements in the North West region. Candidates should have a minimum of 2 years' systems experience and preferably although not essentially, past programming experience. Our major current requirements are for both Analysts and Senior Analysts to work on commercial systems development. Projects will include Ledger Systems, Stock Control, Warehousing and Distribution, Chain Store Systems, Database and Network Systems. Ability to work in conjunction with client team members and maintain a high professional standard will be important. Relocation assistance will be paid where appropriate. Telephone our Birmingham Data Centre urgently for early interviews on 021-454 7908 (Denis Filby/Don Philp). Please complete the attached application form in addition and return to Newcastle, Staffs today. Over 20 current vacancies are available at very attractive salary levels.

ANALYSTS & PROGRAMMERS

BIRMINGHAM — To £6.500

We currently have a large volume of vacancies throughout the Birmingham and West Midlands regions, including a wide variety of new jobs at the rapidly expanding E.M.S. Data Centre.

COBOL and ASSEMBLER programmers should complete our application forms today as an urgent priority. We have an unparalleled range of vacancies available. In addition to hundreds of client vacancies, E.M.S. also have interesting and challenging vacancies within our Turnkey Systems Division for candidates seeking the opportunities of constantly working on new development projects within a modern, attractively furnished Data Centre. Interviews are held daily at the Data Centre.—Why not come along to discuss your career development projects within the Midlands? E.M.S., as the largest recruitment consultancy in the country, has opportunities available for all D.P. staff which are unrivalled throughout the Midlands. Equally, please do not hesitate to complete and return today the attached application form. For only a few minutes initial correspondence the lucrative career opportunities will be forthcoming for you make your time worth the investment

Consultant Don Philp/Denis Filby.

TOP SALESMEN

10K-20K (and it is earnable!)

E.M.S. is planning substantial further development of both our Consultancy and Turnkey Systems Divisions during the coming months. Our Consultancy activities extend across all mainframe ranges and encompass a wide range of industrial/commercial organisations. Applications must, therefore, present as high level Business Analysts capable of rapidly assessing clients' requirements and proposing relevant solutions where appropriate or quantifying the relevant consulting ... in either systems or programming and providing the necessary staff from E.M.S. resources. A vast potential market exists for salesmen marketing resource support.

Equally, our Turnkey Systems Division provided total U.K. coverage marketing Honeywell Level 6 mini-computer systems and supporting software to a wide range of U.K. users.

Experienced Salesmen capable of developing their own territories are urgently required. A substantial quantity of leads are also supplied by extensive and vigorous advertising campaigns and Road Show ventures. Salesmen must ... mini-computer knowledge for Turnkey Systems ... prospective incentives. Apply by telephone for interview during the next week at our Birmingham Data Centre. All U.K. territories will be controlled from the pending regional development of other Centres.

Consultant John Wood.

We have many contract vacancies advised each week. Telephone now for a Contractor's profile form urgently and we will offer you an unrivalled selection of opportunities each month. Even if you are not available for a month or two, register today and let us reserve top opportunities for you to be phased on to later. Telephone 0782-623665 (10 lines). Don Philp, Don Walklate, John Wood, Selina Mills.

هكذا من الأصل

EMS is where the careers are!

EMS

HONEYWELL ANALYSTS AND PROGRAMMERS

HUNDREDS UK — £5000 to £8000

EMS have a vast number of current vacancies throughout the UK, with large requirements throughout London, Home Counties and the North, to work as consulting support staff at established and new installations. Most of our duties incorporate development of new applications systems and assisting with the introduction of new Honeywell mainframes, or Level 6 mini computer systems supporting our successful Turnkey Systems Division.

Excellent salaries are available for all our Honeywell support staff working throughout the UK with opportunities for later involvement in American contracts if required. A minimum of 1 year's Honeywell experience is required with a wide range of opportunities throughout the group for all applicants. Please, urgently complete the attached application form and telephone initially our Birmingham Data Centre to arrange early UK interviews at a convenient location.

CONSULTANT DAMIEN HANDSLIP

ANALYSTS, ANALYST/PROGRAMMERS

LONDON — TO £8500

These attractive positions are for candidates with at least 3 years Data Processing experience interested in working as Support Consultants for a major international manufacturer. Duties will include assisting both in post sales conversion exercises throughout the London and Home Counties region, and for senior staff, occasional pre sales feasibility studies. A working knowledge of COBOL programming on any machine will be advantageous. Full product training will be given, with the opportunity to work on futuristic Real Time and Database projects occasionally. Excellent career prospects exist with early progression based on results. The positions will be based in West London.

CONSULTANT DON PHILP

PROGRAMMERS — SCIENTIFIC

SUSSEX — TO £5250

Programmers are responsible for the design and programming of Engineering/Simulation applications using low level and high level languages. Simulators are controlled by PDP 11/45 mini computers operating in Real Time. A minimum of 1 year's Assembler experience in a scientific environment is sought.

CONSULTANT CAROL PROUDMAN

PROGRAMMERS TO SENIOR ANALYSTS

OXON — £3500-£5500

A large engineering group, located in attractive environmental surroundings, have a quantity of vacancies for all grades of staff at present. Production Control experience is a major advantage. A knowledge of COBOL for Programming vacancies will be preferred. Hardware is optional. Educational attainments should be 'A' levels as a minimum. Duties will incorporate Analysing and Designing specific parts of Information Systems under the supervision of project leaders. Equally, you would specify, write and install programmes necessary to achieve successful implementation, and assist with the cost estimating of systems. Relocation assistance up to 2 months salary will be given where appropriate.

CONSULTANT DON PHILP

PROGRAMMING MANAGER

NOTTS — c £5500

Preference will be for candidates with at least 5 years' programming experience, preferably with significant knowledge of the IBM 370 range working under OS, VS and UMS. PL/I, DL/I and 3790 are utilized. The unit uses a dual processor Data 100 RJE terminal with data validation and data preparation facilities connected to a centralized Birmingham mainframe. The successful candidate will take control of a team of 8 staff, due to expand to 12, and will provide user services both for new applications and maintenance of existing facilities. The post will report directly to the Data Processing Manager.

CONSULTANT DON PHILP

ANALYST PROGRAMMER

KENT — TO £5500

Candidates must be experienced on ICL 2903 or 2904 equipment. RPG II programming proficiency is also sought. The machine runs payroll and ledger packages for a number of subsidiary companies. The successful candidate will be expected to maintain and enhance these particular systems. Ability to instantly identify and resolve any particular machine problems will be important, as will the ability to assess user requirements and to develop and install appropriate systems. The position will report directly to the Data Processing Manager.

CONSULTANT CAROL PROUDMAN

ANALYSTS AND PROGRAMMERS

GLASGOW — £3500-£5000 PLUS BONUS

All candidates should have a reasonable working knowledge of ICL hardware and COBOL programming. The client currently has an ICL 2904 and uses the 7502 concentrators in a Comms environment. Duties include development of on-line systems, investigation of user requirements and systems design, through to programme development and testing. In addition to salaries stated, the company has a self-financing quarterly productivity bonus.

CONSULTANT JOHN WOOD

4 COBOL PROGRAMMERS

EAST LONDON — £4500-£5300

Bureau vacancies are currently outstanding for experienced commercial programmers to work on customer account support. Duties will incorporate programming to specifications produced by the Analysts and testing to the Analyst's satisfaction. Some guidance of trainees will be involved, leading eventually to supervisory duties. Quality consciousness must be maintained at all times in support services to user clients.

CONSULTANT JOHN WOOD

PROGRAMMING MANAGER

STAFFS — c £6500

Experience of IBM 370 PL/1 and Assembler will be essential working under OS/VSI using CICS. Equally, we seek candidates with some experience of modular programming and a working knowledge of systems programming. The section currently has 12 programmers who will report to the Programming Manager. This position in firm reports directly to the Data Processing Manager. The clients are a major industrial group.

CONSULTANT DON PHILP

ICL 2900 SUPPORT TECHNICIANS

READING — Negotiable

Primarily, these positions will involve supporting and maintaining all 2900 services provided by Reading Systems Centre and to provide technical support to Operations and Users of these services.

Candidates will ensure that all services are supported to a level conducive to the achievement of RSC objectives, including "out of hours" support. Equally, you will investigate systems failures with a view to resolving them on-site, or progressing them with the appropriate authority for the earliest possible resolution. Further extensive job specifications will be forwarded on request.

CONSULTANT DON PHILP

TIMESHARING MANAGER

STAFFS AND BIRMINGHAM — Negotiable and profit sharing

EMS are currently developing a Timesharing Division, with Supporting Packages, or custom built systems as required, operating on an ICL 2904, and later, utilizing also Honeywell machines expandable to 2 Megabytes.

We require at this point, an experienced Operations/Programming Manager interested in helping build a division from initial conception towards a high annual turnover level. Client negotiations are already proceeding towards the capture of a small number of large prospective accounts to fully utilize the existing equipment to its total expansion level. Ideally, candidates will have a sound knowledge of ICL hardware, preferably also ICL 2904 series, although conversion training would be given to otherwise suitable applicants. Comms. knowledge will be essential as will the ability to programme in COBOL.

ICL 7502 facilities are directly linked to our Birmingham Data Centre with this unit requiring constant support from the Newcastle-under-Lyme machine.

Further 7502 systems will be linked throughout the Midlands and North following marketing activities in hand at present. Knowledge of packages would be an additional asset, but not essential. Most important is that candidates have the willingness and motivation to assist a new venture starting on a small scale at present, achieve a successful market growth and in turn share enhanced career prospects from the success of the operation.

An attractive salary will be negotiated according to the relevant experience of each candidate, with further benefits for future assessment when profitability is reached as a new operating division within the group. North Staffordshire offers attractive low cost housing, with good amenities. Relocation assistance will be provided where appropriate. Please complete the attached application form in the first instance and return to JOHN WOOD, GROUP MANAGING DIRECTOR.

ANALYSTS AND PROGRAMMERS

EAST LONDON — TO £6500

A commodity trading group using IBM 370's under Power VS, with Shadow as TP monitor to New York require numerous extra staff to assist with new developments. Analysts should be aged 20 to 25 and have a minimum 18 months-2 years' experience. He will work directly with the Data Processing Manager. Programmers should have at least 1 year's PL/I experience and will be given the opportunity to learn other languages as appropriate. A contributory Private Pension Scheme exists, in addition to other fringe benefits. Future mortgage loans are available in appropriate cases. Programmers will be given basic aptitude tests during the interviews.

CONSULTANT JOHN WOOD

SENIOR ANALYSTS

EAST LONDON — c £6500

A major bureau group have urgent requirements for experienced Senior Analysts. Duties include systems specifications, systems design and some support during pre-sales activities. Ability to liaise with users, support programmers and operators will be important. Equally, ability to co-ordinate projects will be sought, including Planning, especially during implementation. The positions involve a high degree of user contact.

CONSULTANT JOHN WOOD

PROGRAMMERS TO SYSTEMS CONSULTANTS

LONDON — £5000-£8000

A software house operating from SW London have numerous vacancies for staff to work both on new systems and maintaining current systems. Hardware preference will be for both ICL 1900 and IBM 360/370 series. Periods of travel both throughout the UK and overseas will be necessitated. Candidates must have the ability to communicate effectively at all levels of management.

CONSULTANT DON PHILP

COBOL PL/I AND ASSEMBLER PROGRAMMERS

LONDON AND UK — £3500-£5500

EMS are inundated with thousands of current vacancies for young programmers with 1 to 4 years' experience. Irrespective of UK location, programmers interested in a move anywhere throughout the UK, are guaranteed so many potential interviews you won't be able to cope with the response: EMS place over 85% of all candidates within this category within the first week of approach. Most UK Data Processing Managers use EMS as the only really viable recruitment consultancy to achieve positive early results. So, if it's a good new career move you're seeking, with the best financial rewards available, complete the EMS career form attached and just watch the results. We guarantee you'll be joining the thousands of other satisfied users each year.

CONSULTANTS DON PHILP CAROL PROUDMAN SUE ADAMS

ANALYSTS

LONDON, HOME COUNTIES AND UK IN GENERAL — £4500-£7000

EMS receive hundreds of vacancies each week from companies urgently seeking experienced Analysts to work in a wide variety of roles from juniors to Systems Managers. Vacancies are too numerous to advertise. EMS guarantee, that for appropriately experienced and qualified Analysts, you'll be inundated with interview requirements within a week of applying to us. There's no facility to match the EMS service nationwide, a consultancy [illegible] in the country for requirements weekly. Even the publications have not [illegible] EMS's chance to [illegible] your career interests and obtain an attractive reward for you by completing the attached career form today.

CONSULTANTS DON PHILP JOHN WOOD CAROL PROUDMAN

IBM DPS SUPERVISORS

KUWAIT

Experienced IBM Op. Managers and supervisors capable of taking a supervisory role in Kuwait installations and training Arab nationalists are urgently required for major new opportunities with interviews to be held in London from the 20th of August onwards. Knowledge of OS and RJE will be advantageous although suitably experienced DOS candidate will also be considered. Distinct preference will be given for single people or married couples with no children. Children will be a major obstacle for these particular vacancies due to restricted family accommodation being available. Excellent prospects exist to save significant sums of money with additional attractive job opportunities for wives. Consultant John Wood.

EMS EMS CONSULTANTS LTD, NEWCASTLE UNDER LYME, STAFFORDSHIRE

Telex 36630

For Office Use only — Company Ref. No

SURNAME
Other Names
Address — Telephone: Home / Bus. / Ext
Post Code

Age	Date of Birth	Place of Birth	Nationality	Height	Weight

Married	Children	Car Owner	Driver	Nature of any Serious Illness

Position Required — Required Salary Range
Present Position — Salary

WHERE DO YOU WISH TO WORK

Within U.K. Yes/No — Will you move Yes/No — Acceptable Areas — Abroad Yes/No — Europe Yes/No — Middle East Yes/No

NUMBER OF YEARS EXPERIENCE

Operating	Programming	Systems Design	Systems Analysis	Management	Total

Available for Interviews
Available for Employment

DETAILS OF SECONDARY AND FURTHER EDUCATION

Schools	Date	Examinations Passed
College/University	Date	Examinations Passed

Business Courses with Dates

1. Present Employer — Town — Position — Date Joined

TYPE OF INSTALLATION: Commercial / Manufacturing — Bureau / Banking — Insurance / Education — Scientific / Engineering

HARDWARE — OPERATING SYSTEM — LANGUAGES

Software or Packages

On-Line / R.J.E. — Real Time / Tele Processing — Time Sharing / Data Base

APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)

Cost Accounting, Budgeting, Forecasting, Corporate Planning, Sales Ledger, Purchase Ledger — General Ledger, Credit Control, Order Processing, Marketing, Distribution, Traffic Analysis — Manpower Planning, Stock Control, Production Control, Petrochemicals, Linear Programming, Simulation — Personnel, Payroll, O.R., Radar, Statistics

Projects Completed — Responsibilities

2. Previous Employer — Town — Position — Date Joined

TYPE OF INSTALLATION: Commercial / Manufacturing — Bureau / Banking — Insurance / Education — Scientific / Engineering

HARDWARE — OPERATING SYSTEM — LANGUAGES

Software or Packages

On-Line / R.J.E. — Real Time / Tele Processing — Time Sharing / Data Base

APPLICATION AREAS YOU HAVE BEEN INVOLVED IN

Cost Accounting, Budgeting, Forecasting, Corporate Planning, Sales Ledger, Purchase Ledger — General Ledger, Credit Control, Order Processing, Marketing, Distribution, Traffic Analysis — Manpower Planning, Stock Control, Production Control, Petrochemicals, Linear Programming, Simulation — Personnel, Payroll, O.R., Radar, Statistics

Projects Completed — Responsibilities

Reason for Seeking Change

Details of type of position wanted

Additional Information —
Please explain below, in an 8-10 line precis, your current duties and applications experience

FOREIGN LANGUAGES

Spoken	Written	Read

Please show the number of years experience of the following. Where your experience is not specified please use the blank spaces.

HARDWARE	OPERATING SYSTEM	LANGUAGES	PACKAGES/SOFTWARE
IBM 360/370	DOS	COBOL	FILETAB
ICL 1900	OS	FORTRAN	DRIVER
ICL 2960/2970	MVT/MFT	ASSEMBLER	CICS
ICL 2903	GEORGE 1	PLAN	IMS
UNIVAC 1100	GEORGE 2	PL1	BDMP
UNIVAC other	GEORGE 3	RPG 2	DBOMP
BURROUGHS 700/800	MCP	USERCODE	PERT
BURROUGHS other	Exec 8	AUTOCODE	VSAM
HONEYWELL 66	GCOS	EASYCODER	IOS/TOS
HONEYWELL 6000	OS 2000/200	ALGOL	MICROFILMING
HONEYWELL other	VMEB/VMEK	NEAT	TELEPROCESSING
NCR	J Level	CORAL	DMS
ICL System 4		OL1	
POP			

3. Past Employer — Town — Position — Date Joined

TYPE OF INSTALLATION: Commercial / Manufacturing — Bureau / Banking — Insurance / Education — Scientific / Engineering

HARDWARE — OPERATING SYSTEM — LANGUAGES

Software or Packages

On-Line / R.J.E. — Real Time / Tele Processing — Time Sharing / Data Base

APPLICATION AREAS YOU HAVE BEEN INVOLVED IN

Cost Accounting, Budgeting, Forecasting, Corporate Planning, Sales Ledger, Purchase Ledger — General Ledger, Credit Control, Order Processing, Marketing, Distribution, Traffic Analysis — Manpower Planning, Stock Control, Production Control, Petrochemicals, Linear Programming, Simulation — Personnel, Payroll, O.R., Radar, Statistics

Projects Completed — Responsibilities

PLEASE CHECK THAT EACH SECTION HAS BEEN TICKED APPROPRIATELY

ADDITIONAL INFORMATION

General

Data Processing

Terminals

Software/Packages

Application Areas

Projects and Responsibilities

TECHNICAL PROGRAMMERS

International Transformation offers you all the advantages of contract work– and none of the disadvantages.

Advantages which include:

Technical challenge – the rapid evolution of computer technology has set the demand for an efficient transformation service at a premium. Armed with over 150 software conversion tools, you will be instrumental in ensuring that our highly-disciplined and automated technique matches that demand.

A wide variety of machine and working environments – our clients operate in all sectors of industry and commerce, and the range of their activities is phenomenal. As far as third generation hardware is concerned, we have recently extended our expertise to cover Univac 1100, Honeywell (GCOS), IBM 360/370, ICL 1900 and 2900, System 4, and CDC Cyber series.

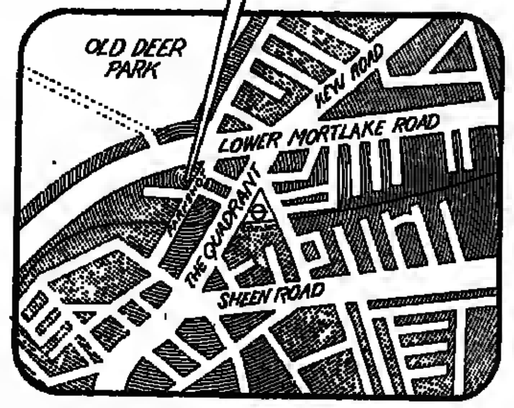
Travel – we are engaged in a number of on-going projects in France, Germany, and Holland; and although you will be based at our offices in Richmond, you can expect to spend approximately 20% of your time abroad. Consequently, a second European language would be a distinct advantage.

High rewards – initial salaries of between £4,000-£7,000 will be negotiable according to experience, and will be supplemented by a range of benefits which includes non-contributory pension and life assurance schemes, BUPA, and permanent health insurance. The benefits of working overseas include a tax rebate on return, and accommodation and tax-free cost-of-living allowances.

We're looking for practical self-reliant men and women, with proven problem-solving ability and a genuine interest in the machine rather than the user aspect of advanced applications.

We can offer you everything contract work can, and at least two things it can't. Security and opportunity. A subsidiary of Rand Information Systems of San Francisco, we have already established a ten-year record of success in the US: our growth rate is accelerating all the time, and we are in a position to allow you virtually unlimited scope for diversification and development. First-class technical training is always available, and we'll be only too pleased to furnish any advice and career guidance you may need.

If you've got at least a year's programming behind you, get in touch.



Or better still, drop in and see us. We'll be in our offices every night next week up until 8.30p.m., and we'll very much like to meet you. If you can't make it, please ring Michael Whelton on 01-940 6412. Or write to him at the address below.

Rand Information Systems Ltd

(formerly Brandon Transformation Services Ltd.)

Eagle House, 1 Parkshot, Richmond, Surrey TW9 2RD

City of Salford

COMPUTER CENTRE, SWINTON

SENIOR SYSTEMS ANALYST

Grade S.O.2 £5727-£6080 inclusive of supplements

OR SYSTEMS ANALYST Grade A.P. 5/S.O.1, £4773-£5568 inclusive of supplements

Post Reference: 1518/CW

SYSTEMS PROGRAMMER Grade A.P.5/S.O.01. £4773-£5568 inclusive of supplements

Post Reference: 1518/1/CW

PROGRAMMER

Grade A.P.4. £4245-£4262 inclusive of supplements

Post Reference: 1518/2/CW

Applications are invited for the above posts in the systems development team at the Computer Centre ... on new systems for the Council's ICL 1900 series computer.

Applicants for the post of Senior Systems Analyst must have a minimum of three years' experience of systems analysis and have designed and implemented at least one major system. Applications will also be considered from systems analysts with less experience and also experienced programmers who wish to move into systems analysis.

Applicants for the post of Systems Programmer should have at least three years' programming experience. The successful applicant will be expected to design computer systems from system specifications prepared by systems analysts and to co-ordinate the work of other programmers assigned to the project.

Applicants for the post of Programmer must have at least one and a half years' programming experience in COBOL or some similar language. A working knowledge of PLAN, communications programs or TP software will be a distinct advantage. Conversion training will be given to successful candidates whose experience has been on computers other than ICL 1900.

These posts are permanent, superannuable and subject to the satisfactory completion of a medical questionnaire. Commencing salary will reflect experience and qualifications. Please write or telephone 061-793 3158 for an application form quoting post reference number to the Personnel Manager, Salford Civic Centre, Swinton M27 2SN, to whom they should be returned by 25th August, 1978.

PROGRAMMERS AND ANALYST/PROGRAMMERS
★ COBOL ★ PLAN ★ ASSEMBLER

PERMANENT or CONTRACT to work with our existing project teams involved in DEVELOPMENT and CONVERSION for clients in WEST LONDON/NORTH LONDON/CENTRAL LONDON and YORKSHIRE/LANCASHIRE.

LONDON CONTACT: IAN GOLD — 01-388 0036
YORKS/LANCS CONTACT: JEFF WORSLEY — 0742 25089

6700 COBOL PROGRAMMER
CONTRACT or PERMANENT required URGENTLY for 8 months. Development assignment in SOUTHAMPTON to work with our existing team.

CONTACT: CHRIS PHILLIPS or DAVE ROBERTS on 01-388 0036.

Fraser Williams computer consultants

West Yorkshire Metropolitan County Council Traffic Unit

OPERATOR/TEECHNICIAN POST REF: TF 34001
T3 £3732-£4146 inclusive of supplement

The Urban Traffic Control scheme involves the computer control of Traffic Signals in Leeds and Bradford, using closed circuit television facilities to monitor traffic.

Control Centres in both cities will operate from 6/7 am to 7 pm Monday to Friday acting also as fault reporting centres and manned by Operator/Technicians on a shift basis.

Working from either Control Room, duties will include first line maintenance procedures on the equipment installed at the Centres and on the street.

Suitably qualified applicants will have a light current electrical engineering background or relevant operational traffic control experience. Driving licence required.

Application forms may be obtained from Directorate of Planning, Engineering and Transportation, Room 288, County Hall, Wakefield and should be returned by 30 August 1978.

Datasolve Datasolve Datasolve

Programmers-Analysts...

Looking for more money,

A new challenge,

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Here's the form

Just complete the coupon below; send it to us and you could be well on the way to a great new job. Or, if you prefer,

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Address ....

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your kind of jobs, your kind of people.

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software engineer/ programmer

We, at Scottish and Newcastle Breweries Limited, are moving towards process control on Intel Micro Computers.

We are now looking ahead as far as improved capacity and sophisticated plant monitoring systems are concerned and are now ready to develop further both soft and hardware with conversion to the 8080 range of micro computers for process control work.

The successful applicant will be required to write in high level language for the new installations as well as in the machine code of the existing computers. He/she will contribute either engineering know-how with experience of writing programmes or experience of programming allied to an understanding of computers gained in a development environment with a computer manufacturer.

Candidates should be educated to at least HNC level with the relevant experience or ideally be educated to degree level. In addition to a salary of around £5,600 which is to be reviewed in October, and an excellent non-contributory life assurance and pension scheme, we offer discount on company products and facilities and generous assistance with re-location costs where applicable.

If you are interested please phone Miss L. Wilson on 031-556 2581 Ext. 47/48 and ask for an application form or write to the Recruitment Department, Scottish and Newcastle Breweries Limited, 180 Canongate, Edinburgh EH8 0LW giving full c.v.

Scottish & Newcastle Breweries Ltd

RUSTON-BUCYRUS

2 years Programming?

Ruston Bucyrus Limited, the British member of the world's largest group of crane and excavator manufacturers have a vacancy for a good programmer to move up to Analyst/Programmer as part of a small but expanding young projects team engaged in challenging and often original work.

This way you can not only make a big step in your career, you can also make a move that will delight your family — into the green surroundings of Lincolnshire, where house prices are low and the office is only minutes away from open countryside.

You'll be working with ICL 1900, using PLAN and COBOL. The rewards will be competitive, including a bonus scheme — and overtime will be well paid. Good working conditions, pension and non-contributory health scheme and subsidised canteen are provided. Relocation expenses will be paid where appropriate.

Take the first big step now. Write or telephone Andrew Sissons, Staff Personnel Officer on Lincoln (0522) 25261 Extension 310. Ruston-Bucyrus Limited, Excavator Works, Lincoln LN6 7DJ.

Computer Shift Leader

Wallingford, Oxon.

... to supervise ICL 1904S with multi-access facilities, running under George 3, and take responsibility for scheduling the work and supervising Computer Operators.

There will be opportunities for standard software work, including the maintenance of the operating system and the development of system programs and macros.

Applicants (normally aged under 27) should have a Degree/HND/HNC or equivalent in an appropriate science subject and at least one year's operating experience.

Appointment will be as Scientific Officer (£2840–£4410, plus shift allowances) with starting salary according to experience and qualifications. Good housing prospects for married people moving into the area.

For further details and an application form (to be returned by 5 September 1978) write to Director, Hydraulics Research Station, Wallingford, Oxon, telephone Wallingford (0491) 35381 ext. 317. *Please quote ref: SA/25/HC*

Hydraulics Research Station

Science Group CIVIL SERVICE

UNIVERSITY OF NEWCASTLE UPON TYNE
NORTHUMBRIAN UNIVERSITIES MULTIPLE ACCESS COMPUTER

TEMPORARY PROGRAMMING ADVISER

Applications are invited from graduates to join a small group within the NUMAC computing service concerned with advising, teaching and providing documentation on the use of computer programs of a statistical nature. Applicants should have a good knowledge of computational statistics and an understanding and sympathy with research workers and students in the social sciences. The Computing Laboratory has excellent facilities including powerful IBM hardware with interactive capability and a large repertoire of library programs.

The appointment will be for one year and will be made on one of the following scales according to age, qualifications and experience Range IA £3,680-£8,178 or Range II £5,730-£7,808 per annum. Membership of the appropriate University superannuation scheme will be required.

Further particulars may be obtained from the Registrar, The University, 6 Kensington Terrace, Newcastle upon Tyne, NE1 7RU, with whom applications (3 copies), together with the names and addresses of three referees, should be lodged not later than 26th August, 1978. Please quote reference CW.

CONTRACTS

At least 2 years' OPERATIONS experience?

If you are a freelance operator now, or intend to go freelance in the near future, contact us for details of our current and future assignments in all areas of the U.K.

The ability to communicate and an intelligent attitude towards freelance work is considered essential.

IMMEDIATE

OS JCL WRITERS — Long contracts in the South
IBM OS VS1/2 OPERATORS
IBM DOS VS POWER OPERATORS
ICL G2+ & DME OPS (ALSO PART-TIME)
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ICL SYSTEM 4 J 1800 OPS — North and South
HONEYWELL OS 2000 OPERATORS
HONEYWELL GCOS OPERATORS
BURROUGHS 1700 OPERATORS
DDE/PUNCH/VDU OPERATORS

FORTHCOMING

OS JCL WRITERS
IBM DOS VS POWER OPERATORS
ICL G2+ & DME OPS (ALSO PART-TIME)
ICL 2960 VMEB OPERATORS
ICL G3 OPERATORS
HONEYWELL OS 2000 Ops and Senior Ops and Shift Leader for one-year contract. Top rates and bonus
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UNIVAC 1100 & 9000 OPERATORS

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PHONE 01-439 6481 (24-hour answering service) for more information or send coupon below for immediate attention.

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(BLOCK CAPITALS PLEASE)

Complete the coupon and return to the address below, for your next PERMANENT or CONTRACT job.

Name (in full) ....

Address (Permanent) ....

....

Telephone Home .... Office ....

Type of Transport .... Date of Birth ....

Current Position (Contract/Permanent delete) .... Salary/Rate ....

Position Required (Contract/Permanent delete) .... Salary/Rate ....

Notice Required/Date Available (delete) ....

Areas Preferred First Choice .... Second Choice ....

Experience to date: (Last Position First)

Company Name and Location	From Mth/Year	To Mth/Year	Hardware	Operating Systems/Software

هكذا من الأصل

Date .... Signature ....

EFFECTIA GRAVIS

NATIONAL HOUSE, 60 WARDOUR STREET, LONDON W1V 3HP
COMPUTER PERSONNEL CONSULTANTS LICENCE NO. SE(A)62

REG. No.
DATE
CW 10/8/78

NEW

TECHNICAL SUPPORT POSITIONS

IN OUR PROFESSIONAL SERVICES DIVISION

Our Professional Services Division provides a wide range of consulting services to Industry, Commerce and Government - both independently and in support of our Systems and Data Services divisions. These new positions arise in expansion of our technical support group involved in pre- post-sales assignments.

WHO IS CONTROL DATA?

WE are a computer company employing 11,000 people worldwide

WE have a long commitment to the computer industry, the United Kingdom and the training and advancement of people

WE are a world leader in the provision of computer services, large-scale computers and peripheral equipment.
This position is continually strengthened by our ongoing investment into more advanced products and services. Such a range of activities presents considerable scope for the advancement of personnel at all levels and disciplines.

WE offer a challenging and rewarding career opportunity with involvement in software development, installation and support, together with some sales-related activities in the areas of system configuration and benchmarking.

WE are looking for technical people of the highest calibre and offer salaries and associated benefits commensurate with the demands of the post.
If you have the qualities and experience we are seeking – please read on.

WHO ARE YOU?

YOU will be intelligent, enthusiastic, articulate and self-motivated.

YOU will be at least 25 years old with several years' systems software experience. A knowledge of Control Data's Cyber 170 operating systems, particularly NOS/BE, would be advantageous.

YOU may have a degree in computer science but more essential is a sound knowledge of operating systems, the ability to quickly comprehend new concepts and to communicate with customers.

YOU may expect the possibility of travel in the U.K. and Europe.

Please write to Mrs. Margaret Spence with full details of your career to date.

Professional Services Division, Control Data Ltd., 22a St. James's Square, London, S.W.1. Telephone 01-930 7344.

CONTROL DATA

MORE THAN A COMPUTER COMPANY

British Waterways Board

Computer Centre
Wembley

We are currently involved with 24 Computer Applications, encompassing the many and varied interests of the Board. They range from Water Control to Warehousing, Plant Utilisation to Craft Licensing, as well as the normal Payrolls, Ledgers, etc.

We have outgrown our present configuration, which is to be replaced later this year with the new Burroughs "B2800" series of Computer.

This exciting new development will enable us to develop a terminal network to cover all our administrative centres in England and Scotland. The network will be channelled through a "front-end" processor linked to the main frame, which will also run alongside our existing batch work, in a fully multi-worked environment.

Applications are therefore invited for the following posts:

Senior Analyst/ Programmer (Cobol)
(Salary Range £5712-£6160)

Analyst/Programmer (Cobol)
(Salary Range £4285-£4712)

Annual Salary review due in September.

These are senior posts within the Board's organisation and applications should state full details of all previous experience in the computer field.

Apply to Principal Personnel Officer, British Waterways Board, Willow Grange, Church Road, Watford, Herts. WD1 3QA.

Inner London Education Authority

Tilbi ILEA Schools and Colleges

COMPUTER SERVICE SUPERVISOR

Salary Range: £5,284-£7,108 (inclusive of all allowances).

This post is seconded by the ILEA to the City of London Polytechnic Computer Centre. The person appointed will work to the computer manager and will be responsible for the day to day supervision of a computer service to 160 secondary schools and some 30 colleges of further education. Interactive facilities are provided on a HP2000 and a Systime 8000 which will shortly be enhanced to support jointly, up to 80 simultaneous users. There is a team of support staff working to the supervisor.

The Authority is committed to developing computer education in it's schools and colleges and the person appointed will have an interest in all aspects of this development.

Application forms and further details from: The Education Officer, EO/Estab. 2A/1, Room 307, the County Hall, London SE1 7PB. Telephone 01-633 7744 ext. 2201.

Please enclose a large, stamped addressed envelope for reply.

Completed forms to be returned not later than 30 August 1978.

LEICESTER POLYTECHNIC SCHOOL OF ELECTRONIC AND ELECTRICAL ENGINEERING

COMPUTER SYSTEMS ENGINEER

To support the full day to day operation of a disk-based Data General Nova minicomputer.

In addition, the engineer will be required to develop hardware and software for a variety of minicomputer and microprocessor systems.

A degree in Electronic or Electrical Engineering or Computer Science is normally required for this post. Experience of computer hardware and software would be an advantage.

Salary £4771-£6670 inclusive of supplements.

Application form and further details available from Senior Technical Officer, Leicester Polytechnic, P.O. Box 143, Leicester LE1 9BH. Tel: (0533) 551871 Ext. 2201.

Data Processing Recruitment Consultants

Main-Frame + Mini Programmers
Greater Manchester
Salaries: £6—9.5K (a.a.e.)

A very prestige client with headquarters in London and regional offices located in Cheshire and throughout Europe urgently requires the following: Real-Time and on-line Programmers, Systems and Data base designers and compiler specialists with 2-5 years experience.
Of particular interest would be people with relevent experience in one or more of the following: Ferranti DEC with Basic, RTL II or Coral and IBM or ICL with Assembler, PL/1 or COBOL. Also IMS or similar and Data Base design.
The scope of projects is both broad and demanding and certainly in keeping with the prestige of this client. You will play an important role in project development and the opportunity to enhance your technical expertise is one of the attributes of working with this reputable group. Fringe benefits are well above average and full relocation expenses will of course be met.

Message Switching + Communications
Holland
Salaries: £10 - 16K + Top Benefits

A prestige International Client is seeking to expand and establish new project teams working on wide and varied applications areas with emphasis on Data Communications, Message Switching and Mini Software.
Can you picture yourself working in the forefront of mini systems applications and software development? Become a member of one of numerous specialist project teams in which you will make a valuable contribution whilst at the same time expanding your own frontiers of knowledge and experience.
This is a unique opportunity to enhance your career by extending your horizons and developing State-of-the-Art D.P. technology.
Successful candidates are likely to be either graduates (Computer Science or Maths) or have a very solid background in advanced computer applications and are probably aged between 23 and 33. You are presently likely to be either a Systems Designer/Consultant, Analyst Programmer ar a programmer in a Mini computer environment with extensive Assembler experience. Any specialist expertise in the areas of Data communications, Message switching, computer networks, Process-control or Mini computer software will be considered particularly advantegeous.

Decnet or X25
Denmark and Netherlands
Salary: £12 - £15K + Outstanding Benefits

When it comes to State-of-the-Art Real-time Mini Software our clients defer to no-one. They are internationally regarded as "technical frontier pushers" and as a valued project team member you will share their prestige and acclaim.
To meet a continuous phased growth programme our clients are establishing several new project teams requiring Analysts and Programmers. Both will be well versed in Mini Assembler and the former should have some design and implementation experience. Candidates, ideally between the ages of 23 and 30 years should have a willingness to relocate for a meaningfully extended period to either location. In the longer term, our clients can offer career postings in Spain, Germany and Middle East. Meanwhile, every assistance will be given to candidates in re-location. We or our clients will conduct initial interviews throughout August.

IMS Analysts + Programmers
London + E.E.C.
Salaries: £16K (E.E.C.) £9.5K (U.K.)

A multi-national U.S. Corporation specialising in Teleprocessing and Network design and implementation has retained Logistix to seek out and identify senior personnel for their Central London, German and Dutch offices. In particular they require Business Analysts and Programmers.
Suitable applicants must have current IMS (DB or DC) expertise preferably in an O.S. environment. Programmers will be using either COBOL or PL/1 but BAL would be acceptable. Any additional Database experience would be of added interest to our clients as would knowledge of either TOTAL, SHADOW or similar software.
The scope of projects in which our clients are engaged is very broad-based and should appeal to even the most demanding and forward thinking candidates. The very high salaries reflect the prominence which our client places on the acquisition of these key personnel.
Early interviews are envisaged and offers will be made within 10 days.

Project Manager
Middle East
c. £18K (Tax free)

We are retained by a U.S. consultancy to recruit a Project Manager (ideally aged 30 - 40 years) offering an in-depth knowledge of both Data Base and Teleprocessing techniques in an IBM 370 environment.
The successful candidate will be required to supervise and control all Data Control and Data Entry staff whilst managing the feasibility, design and implementation of new computer systems. Additional responsibilities will entail the provision of training to aspiring data processing Arab nationals; the development of the recently formed training department and the co-ordination of inter-departmental liaison.
In addition to a tax free salary, the company offers a 35% regional allowance, free furnished accommodation and financial assistance in the purchase of a car. In the first instance, you will be offered a one year's renewable contract.
Please note however, that we can only take applications from those who will consider a BACHELOR posting. Interviews will take place in our offices between 14th and 28th August and offers will be made two weeks thereafter.

Logistix, Freepost 32, London W1E 3YZ
01 491 4636 (Reverse charges) **Telex 28800**

LOGISTIX

Avon House, 366 Oxford Street, London W1N 9HA

MYRIAD

EXTENSIVE USER LIAISON

ANALYST/PROGRAMMERS

NORTH LONDON/SOUTH HERTS **c £6000**

Our client, a major retailing organisation with extensive outlets throughout the U.K., require top-class technicians to help maintain their lead in the market.

The company is currently implementing a comprehensive development programme incorporating an upgrade in machinery and the installation of on-line applications. The Systems and Programming team work to highly professional standards and encourage the use of latest techniques including DATABASE.

The successful applicants should be self-motivated and be capable of understanding user requirements and so gain job satisfaction in assisting with the implementation of successful projects. Candidates must have a minimum of two years' commercial COBOL programming experience, and be involved in or looking to enter the field of user liaison.

Apart from the challenge of new systems on an upgraded mainframe using the latest processing techniques, a competitive salary, Christmas bonus, flex-time, luncheon vouchers combine to make this an excellent move in one's career progression.

Ref. N1/1008

MYRIAD APPOINTMENTS LIMITED Computer Personnel Consultants
Telephone or write to:- 30 Fleet Street London EC4Y 1AA **01-353 0981 (24 hrs)**

Operators/Senior Operators
Stratford E15, up to £4,850, + substantial benefits

When you're looking for the best...

You undoubtedly share more with Morgan Guaranty than you realise. For instance, like us, you're looking for the best. Like us, you probably also realise that it pays to be better.

So, that's why we give a starting salary of up to £4,850 a year with an annual bonus of up to 6%, rising to as high as 15%, mortgage facilities at 3% interest rate, a subsidised staff restaurant and a series of excellent additional benefits.

As an international Corporate Bank with an outstanding reputation, you could hardly find better career prospects than those available at our UK Data Centre in Stratford. Our modern building is only a minute away from the tube station and bus terminal and there is ample free parking for those with their own cars.

Our equipment is also likely to be better than the hardware you're currently using. An IBM 370/138 and 370/135 (with a 370/148 on the way) means you should have experience of DOS/VS and preferably either POWER/VS or CICS/VS and be prepared to work shifts.

If you feel you have what it takes, we would very much like to hear from you.

Just write to Kathryn Riley, Head of Personnel Administration & Recruitment, Morgan Guaranty Trust Company of New York, P.O. Box 161, 33 Lombard Street, London, EC3P 3BH.

Morgan Guaranty
Trust Company of New York

Or telephone her today on 01-555 3111 extension 2747.

it pays to be better.

THE SALES BIT

Remember the 4P rule

WE were involved the other day in an assignment for recruiting marketing analysts and one of the apparently simple questions we asked was: "What is marketing?" The answers we got were wide and varied.

Many saw it as a discrete activity closely related to public relations, advertising and market research, while some gave the impression they thought it was a way of avoiding the use of that nasty word — selling!

One only has to look at the diverse ways in which companies within the computer industry organise their sales and marketing organisations to see that there are many different opinions concerning the purpose and importance of marketing. For some, marketing is an essential function; to others it is a total void.

There are many definitions of the word marketing. My own company uses the abbreviation 4P.

- The right Product
- In the right Place
- At the right Price (Profit)
- With the right Promotion

A gross simplification, perhaps, but it is only intended to describe the function of marketing. One must then consider all those aspects of a company's operation which have a direct or indirect effect on the creation of a product, making it available where and when it is required, ensuring it is both competitive and profitable and informing potential buyers that it will satisfy their needs. Any department involved in any of these activities must interact with the comprehensive function of marketing:

- Research
- Production
- Publicity
- Finance
- Sales
- Personnel
- Distribution
- Client Support

i.e. the whole organisation, to all intents and purposes.

Because of its extremely broad interests, marketing is often regarded with suspicion by people in other departments. Marketing people may be seen as a threat to their authority or even as totally superfluous entities providing at best an intangible benefit. Such a reaction is unfortunate, but not uncommon.

Yet if marketing is to play an effective role, then management throughout any organisation must be prepared to abdicate some of its sovereignty in order to maximise the chances of their company's future survival within the marketplace.

Unfortunately, marketing within the computer industry is for the most part a gesture. It is often a refuge for "failed salesmen"; a collective term for the peripheral activities of selling that salesmen don't have the time to do. A bit of public relations here, a bit of advertising there (just to spend the rest of the budget!), producing a few brochures, and so on — basically a waste of time and money which makes little or no contribution to marketing in the context of 4P.

Marketing is an essential and comprehensive activity for ensuring the present and future of a company by creating and satisfying a demand for the products within its capability, thus generating ongoing employment for its employees and profits for expansion and future development, as well as satisfying its investors. An important function by any measure.

Yet many companies within the computer industry have no marketing operation at all, even on paper.

A client recently said to me, "We don't need marketing; our problem is building enough plants to produce the damned stuff." Well, in some ways that's a nice situation to be in, but what about tomorrow? Empty factories? It has happened before.

Complacency is a close companion of success which makes it very tempting to leave tomorrow to look after itself, particularly under the influence of the "annual budget syndrome." Many products within the computer industry are actually an emulation of some other company's success, or a development on the basis of "Me Too" technology, which assumes that if one company has created a demand, all that has to be done is to produce a cheaper copy in order to ensure success. In a fast expanding market, that is feasible, but come another 1971 and those companies that have their 4P wrong run a severe risk of going to the wall.

TRADER

Catalogue of aids for teachers

A CATALOGUE* of books, wall charts, films and other aids for school teachers has been produced by the British Computer Society. Details given with each item include the price, a brief description and the address of the distributor.

The catalogue covers books, wall charts, simulated games, logic tutors, overhead projector transparencies, teaching packages, films, slides, film loops, video programmes and periodicals. There are also lists of addresses of examination boards, of BCS branches and of branches of the computer education group.

*Computer Educational Aids and Resources for Teachers, 30 pp. 95p and 10p for postage. National Committee for Audio-Visual Aids, 33 Queen Anne Street, London W1M 0AL.

Puzzle answer

Real-Time Systems/ Programming
up to £6000 p.a.

Mini-based real-time projects

West London

Programming + analysis/ design

Overseas travel opportunities

Generous benefits

Sports/social facilities

IAL, with a 30-year background of communications systems involvement, is currently engaged in the supply of computer-aided despatch systems, both in the UK and overseas. Vacancies exist at all levels within the Computer Systems Division for staff to work on projects based on single and multiple Nova/Eclipse systems.

The positions are based in West London (close to the M4 and airport). Good salaries and associated benefits are offered and overseas travel for short periods is likely, for which generous additional allowances are paid. These are opportunities for involvement in an exciting line of development with enormous potential:

Programming Project Leader

A Project Leader is required to lead a small team of analysts/programmers in the design and implementation phases of mini-computer systems. Experience of real-time or mini-computer systems is essential.

Systems Analysts

Analysts are required to work on the design of real-time mini-computer systems. They must be prepared to work with the minimum of supervision, communicating directly with customers. Experience of real-time systems either at the programming or analysis level is essential.

Systems Programmer

A Programmer is required to join a small systems team supporting IAL's applications programming teams. He/she will be responsible for all aspects of Data General and IAL systems software configuration and support on Eclipse AOS and Nova RDOS systems. Whilst experience in Data General software is desirable, applications are invited from programmers with systems experience on similar multi-programming or multi-tasking systems.

Analyst/Programmers

Analyst/Programmers are required to work on the design and implementation of real-time mini-computer systems. Applicants should have experience in two or more of the following:

* Mini-computer systems * FORTRAN * CORAL * ASSEMBLER
* Real-time software design * Data General software
* Multi-tasking operating systems

Please write or phone as soon as possible quoting ref. no. 377, to: The Senior Recruitment Officer, IAL, Aeradio House, Hayes Road, Southall, Middlesex. Tel: 01-574 5134.

IAL

1976

CLEVELAND AREA HEALTH AUTHORITY

The Sir Alexander and Lady Ewing Audiology and Rehabilitation Centre for the Deaf

RESEARCH ASSISTANT (MEDICAL PHYSICS)

Applications are invited for the above post. The successful candidate will assist in a study of electrophysiological techniques for the early diagnosis of deafness in children using a system based on a mini-computer.

Candidates must have a good honours degree preferably in computer science or physics with some experience of computer programming.

The post will be tenable for one year in the first instance. An application is being made for an extension by an additional year. Candidates will be encouraged to study for a higher degree.

Salary £3,486.

Applications should be made to the Administrator, North Riding Infirmary, Newport Road, Middlesbrough, Cleveland TS1 5JE.

Enquiries about the above post should be made to Mr P. Newall (at the above address). Telephone Number 0642-246002. Extn 38

UNIVERSITY OF SALFORD COMPUTING LABORATORY

Applications are invited for the post of

COMPUTING OFFICER
(Systems Software)

The Laboratory provides a general computing service to the University based upon an ICL 1904S and a PRIME 400/300 configuration. It is also highly involved in the North West Universities Network project which links five universities. The main duties of the person appointed will be in enhancing the George III operating system of the 1904S to continue the network development and in the on-going provision of the overall 1904S service.

The salary will be in the range £3,880–£6,178.

Further particulars and application forms may be obtained from the Registrar, Salford University, Salford M5 4WT, and should be returned by 25 August, 1978, quoting reference CL/58/CW.

Senior Programmer

Hertfordshire

Rank Xerox Manufacturing Group in Welwyn Garden City utilises some of the most advanced engineering techniques in the production of a wide range of electronic assemblies and special materials.

Our small, but professional computer department develops and supports local on-line and batch systems. Hardware is PDP 11/34's for on-line systems and batch and time sharing links to large Rank Xerox Honeywell and IBM datacentres. Systems are written in COBOL, BASIC + and APL.

We now have a vacancy for a Senior Programmer to be involved in developing, installing and maintaining:

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- batch systems using COBOL with timesharing program development terminals
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You must have at least 2 years COBOL or BASIC experience and be able to produce a variety of easily maintained programs quickly.

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So, if you've got the enthusiasm to learn new skills and want a job with real involvement in a stimulating environment ring Andy Kennedy or Peter Braithwaite now on Welwyn Garden 23434 ext. 3348, or write to either of them at Rank Xerox Limited, Bessemer Road, Welwyn Garden City, Herts.

RANK XEROX

WELWYN GARDEN CITY MANUFACTURING GROUP

GREENFORD, MIDDLESEX SALARY: NEGOTIABLE

ASSEMBLER PROGRAMMER

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INSTALLATION: ICL SYSTEM TEN on line equipment with V.D.U.'s controlled by a small team who are developing a tailor-made system to meet the Company's needs.

POSITION: Applicants should have a minimum of one year's experience with Assembler, preferably in an industrial environment. Ability to communicate effectively with users is essential.

Our pleasant offices are situated in Perivale with car-parking facilities available and we offer a full range of employee benefits.

Please write or phone: **Personnel Department, Perivale-Gütermann Ltd., 22 Wadsworth Road, Greenford, Middlesex. Tel: 01-998 5000.**

SAFE
COMPUTING LIMITED

Safe Computing, a subsidiary of Chubb, is installing a 2960 with communications facilities at West Bromwich in September this year.
The staff we now seek will initially be required to work on our 1903A at Wolverhampton but will be expected to transfer in due course.

COMPUTER OPERATORS
£3842-£4240

Applicants should have at least 6 months' experience, preferably on 1900 equipment.

DATA CONTROL CLERK
£4000

Applications will be considered from candidates with a general computer background, although specific experience is preferred.

In addition to the above salaries, the usual terms and benefits of a large company will apply. Please write in the first instance giving details of age, qualifications, and experience, to:

**J. A. THOMAS,
Computer Operations Manager
Safe Computing Limited
PO Box 61
Wednesfield Road
Wolverhampton WV10 0EW**

Ascii through the Logic Gate

An epic in 32K words, by Richard Forsyth

Block 10 (Block Contains 2 Characters)

Hex and Zap are still up in their secret hideout in the Sierra Nueva, waiting for Cleo and Lambda; but there is no sign of them.

THEY spent the first day clearing rubble out of the entrance tunnel and generally tidying up. It was thirsty work. The water in the little lake, which had been so intensely blue and cold, was now clouded and, Hex noticed, tepid; but it was all they had to drink.

Next they set about trimming their access overheads by purging temporary files. Being androids, and therefore accustomed to having a distributed database to back them up, they were worried about the long-term ill-effects of data deprivation. They had heard frightening stories of what might happen to androids isolated from the Network. Hallucination, psychosis and even parity failure had been mentioned.

They discussed various possible solutions, and decided that the best stopgap would be to modify the micro that Dr Null had given Hex on his deathbed to act as stand-alone back-to-front-end processor responsible for organising their offline storage, and Lambda's when she arrived.

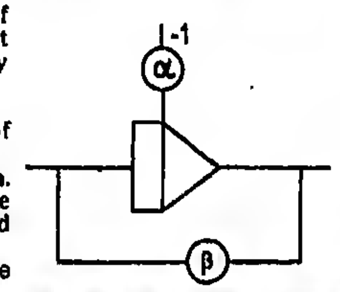
Zap had thoughtfully brought a bag of assorted chips when he fled the research station, and he was soon happily immersed with Hex's soldering iron in the delicate business of TTL knitting, otherwise known as logical circuit design. Hex left that side of it in his capable hands and began thinking about the software. Since the essential medium for reliable system design (the back of an old envelope) was lacking on this occasion, he made do with the ragged scrap of paper that Dr Null had called his blueprint for an anti-data device.

Half-way through, out of curiosity, he turned it over. It looked too simple to be of any use.

He showed it to Zap.

"What do you make of this?"

Zap held it at arm's length. "It looks like an old analogue diagram. What's it supposed to be?"



"Dr Null claimed it was a black noise generator, capable of obliterating data patterns by feeding back a negated image."

Zap turned the paper upside down and squinted at it. "No," he said, "it's only an exponential decay function. He hasn't even done the scaling. Might as well tear it up." He handed it back.

With that he returned to his soldering. Hex shared his scepticism, but decided to keep it nevertheless until he had a more convincing explanation of what it did. He tried to get on with his system specification, but there was something on his mind.

"Zap," he asked, "What made you join us and betray the System?"

Zap looked up. "We really had no choice. Once you and Cleo had called on Lambda she either had to turn you in straight away or throw in her lot with the other side; you can't keep secrets from the Network. And once she had made up her mind, my course was obvious too." Then he shrugged. "Besides, a being of my talent – it had to happen some day. I'm an instruction-set artist. When I started they needed people like me. Programs were hand-coded in those days. Now it's just a question of sticking together a couple of off-the-shelf modules and away you go — no creativity involved. It's the same with hardware too. The System can't make use of my kind any more. I used to have responsibility for major projects; but I had hit a dead end."

"I see. No job satisfaction."

"Yeah. That's why I have a few good words for James Hock and his mangy old text-retrieval system. He's totally incompetent of course, and his program's more full of bugs than a maggot's nest, but at least he tries. He's been up and down the country trying to hawk it to anyone who'll listen."

"But it doesn't work, eh?"

"Actually, that's not the point. You or I could make it go in two minutes flat. The reason no self-respecting installation will touch it is that it is hand-made. It was designed and coded by one person. It doesn't conform to the guidelines laid down on standards. It uses unorthodox control structures. It's too messy to be maintained automatically. Above all, it's not plug-compatible."

Hex thought about this, then looked down at his own scribbled jottings. To him it represented a transaction-processing monitor in embryo, to anyone else it would be an indecipherable scrawl. "Well if you like unstructured software, I guess you'll approve of mine."

Zap laughed.

Through the first day, these activities kept them occupied, but as night approached they became increasingly worried about the fate of Cleo and Lambda. When it was dark they sent Ascii to guard the tunnel entrance and sat in the cove.

"What do we do if they don't turn up?" Hex asked.

"I don't know."

"We can't stay here for ever."

"We certainly can't. We have about five days before the System catches up with us."

"Why so soon? They think they bombed me out of existence here. And if they know I'm on the loose again that will make them mistrust whatever extrapolation function they used to locate me."

"I wouldn't bank on it. They're very thorough, and they have a lot more processing power than we have. If you want to be rational about it, our position is hopeless. All we can do is make some kind of impact before we are wiped out."

"I don't want to be rational about it, then."

"Have it your own way. But you know the System as well as I do. Two or three androids are unlikely to cause its demise."

"There must be a way," said Hex, though he couldn't think of one.

Their talk petered out. They did get some sleep, but not much. Before dawn Hex was up and crawling to Ascii's sentry post. When he poked his head out, he received a shock. He ran back down the tunnel.

"Zap!" he shouted, "Ascii's gone."

What will become of our heroes and heroines now? Wait and see.

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MARTINS COMPUTER SERVICES
The D.P. Recruitment Specialists for the Midlands/West Country areas

DP MANAGEMENT

PROGRAMMING MANAGER at least 5 years' COBOL. Preferably with UNIVAC hardware. Area; Nottinghamshire. Salary To £6,000. Ref. M30.

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CHIEF PROGRAMMER at least 5 years' programming in Plan and COBOL. Area. Wolverhampton. Salary To £6,000. Ref M35.

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SYSTEMS MANAGER required by existing IBM systems 3 installation, At least 4 years commercial experience including RPG II. Area Staffs. Salary to £6,000. Ref. M28.

SENIOR SYSTEMS CONSULTANT required by Mini manufacturer. In-depth experience of at least 2 Mainframe manufacturers especially IBM including project management with communications. This position is based in Birmingham but successful applicant must be prepared to travel throughout the U.K. with occasional European travel. Salary to £7K plus car or car allowance. Ref SA155.

PROJECT LEADERS/ SYSTEMS ANALYSTS

SENIOR SYSTEMS ANALYST at least 2½ years' D.P. experience including production systems. Area. Leicestershire. Salary: To £6,500. Ref. SA171.

SYSTEMS ANALYST minimum 2 years' systems commercial applications. Area. Northamptonshire. Salary To £6,500. Ref. SA165.

ANALYST PROGRAMMER at least 18 months' programming in RPG II. Area: Northampton. Salary: C £4,500. Ref. SA185.

OPERATIONS PLANNING ASSISTANT at least 3 years' in D.P. specialising in systems design. Area Burton-on-Trent. Salary To £6,000. Ref. SA179.

PROJECT LEADER. Responsible to Group Data Processing Manager, at least 2 years' Production Planning and Control Systems, plus a formal programming background in Cobol or RPG. Experience of a small mainframe and terminals required. Area Worcester. Salary to £6,500. Ref SA088.

SENIOR SYSTEMS ADVISOR. Required by mainframe manufacturer for pre- and post-sales work. At least four years in Commercial systems including a working knowledge of Cobol or RPG 2. Area. Midlands. Salary c £6,750 plus generous car allowance and expenses. Ref. SA129.

SENIOR TECHNICAL ADVISOR required by Major Mainframe manufacturer, at least 8 years' systems experience with an in depth knowledge of most Commercial applications. Area. Birmingham. Salary c £6,000. Company car supplied. Ref. SA128.

PROJECTS LEADER/PROGRAMMING. At least 3 years in D.P. with On-line and database experience. Area Lincolnshire. c£6,000. Ref. M24.

SENIOR SYSTEMS ANALYSTS. At least 5 years in D.P. Preferably experienced on ICL Hardware developing Real Time. Area: Leicester. Salary to £6,500. Ref. SA132.

SYSTEMS ANALYST at least 2 years Commercial Systems. Area Leamington. Salary c£6K. Ref P280.

INSTALLATION SUPPORT SUPERVISOR to demonstrate Mini Computers and support the Sales Consultants in both pre and post sales. A minimum of 2 years in programming and analysis using PL/1 or Assembler language. Salary to £6,000 plus car and expenses. Ref. SA187.

SENIOR PROGRAMMERS/ PROGRAMMERS

SOFTWARE PROJECT LEADER must have several years' experience with mini computers using Realtime. Area Wiltshire. Salary To £6,500. Ref. P337.

PROGRAMMER 1 year plus assembler with mini computer using Realtime. Area: Birmingham. Salary. To £4,500. Ref. P332.

PROGRAMMER at least 12 months' programming in basic + RSTS or similar language using mini computers. Area Kidderminster. Salary C £3,750. Ref. P323.

SUPPORT SPECIALIST required by Mini Manufacturer at least 1 year experience in Assembler. area: Birmingham. Salary to £5,000. Ref. P227

PROGRAMMER, 1 year plus PL/1 or Assembler, knowledge of Circa or IMS an advantage. Area: Birmingham. Salary to £5,000. Ref. P205.

LEAD PROGRAMMER. At least 4 years' experience in IBM Cobol and Assembler using DOS/VS with Cics. Area: Bristol. Salary Neg. Ref. P199.

PROGRAMMER. 1 year plus Cobol. Area Northamptonshire. Salary: to £3,500 plus subsidised mortgage. Ref. P186.

ANALYST PROGRAMMER, at least 2 years' programming in Basic + Cobol or RPG11. Area. Staffs. Salary to £5.5K. Ref. P32.

TECHNICAL PROGRAMMER/ANALYST required by a National Software House to develop computerised type setting applications. Good working knowledge of Fortran essential. Area Birmingham. Salary to £5,000. Ref P257.

SOFTWARE DESIGNER PROGRAMMERS for Computer Control, Data Switching and Office automation applications. Degree essential plus a minimum of 2 years Programming in Real Time systems. Area Nottinghamshire. Salary to £6,500. Ref P284.

PROGRAMMER/ANALYSTS required by National Company to assist existing team programming in Cobol for IBM 370 installation. Programmer with 18 months plus Cobol considered for this position. Area Nottingham. Salary to £5,000. Ref. P281.

CONSULTANT PROGRAMMER required by a Time sharing bureau. Degree required plus experience of programming in APL. Area. Midlands. Salary: c£4,500 plus car. Ref. P242

PROGRAMMER at least 1 year COBOL any hardware. Opportunity to progress into Systems. Area: Coventry. Salary. c£4,500. Ref. P306.

SENIOR PROGRAMMER at least 2 years programming in RPG II. Area Shrewsbury. Salary. Neg. Ref. P268.

PROGRAMMER/ANALYST at least 18 months RPG II experience. Area North Staffs. Salary to £5,000. Ref. P.304.

OPERATIONS

OPERATOR ANALYST with knowledge of JCL and able to liaise with systems analysts. Experience of report writing. Area: Burton-on-Trent. Salary £4,000. Ref. 0100.

OPERATOR SHIFT LEADER for IBM 370 using DOS VS Power. 12 months' plus experience. Double day shifts. Area Wolverhampton. Salary C £3,500. Ref. 0123.

OPERATOR at least 1 year operating ICL 1900 or 2900 range. Under George II. Area Northamptonshire. Salary. £4,200. Ref. 0122.

OPERATOR at least 12 months operating IBM 370 using OS MVT. Area: Coventry. Salary. C £3,800 Ref. 0115.

OPERATOR at least six months operating ICL 2903. Area: Bristol. Salary. C £3,000. Ref. 0118.

DATA CONTROLLER required by IBM 370 DOS/VS installation 2 years experience plus a thorough clerical knowledge of Data control. Operating experience an advantage but not essential. Days only. Area Birmingham. Salary to £4,000. Ref PO109.

IBM COMPUTER OPERATORS required for following areas: Cheltenham, Redditch, West Bromwich, Coventry, Grantham, Birmingham, Leicester, Wolverhampton. salary range £3,000-£4,000.

ICL COMPUTER OPERATORS. Birmingham, Stoke, Leicester, Coventry, Wolverhampton. Salary range: £3,000-£4,000.

HONEYWELL OPERATORS. Birmingham, Wolverhampton, Cheltenham. salary range £3,000-£4,000.

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We have many more D.P. positions on our register in all areas of the Midlands/West Country.

Contact: Graham Aston, M.E.C.I.
MARTINS COMPUTER SERVICES, First Floor, Western House, Opposite Albany Hotel, Smallbrook Queensway, Birmingham B5 4HQ. telephone 021-643 2111. 24-hour answering service. Evenings and weekends 021-454 0331

We are now able to interview until 6.30 p.m. and Saturday morning by appointment.